



TITLE:

Livestock Individual Identification among
the Turkana : The Animal Classification and
Naming in the Pastoral Livestock
Managemen(Dissertation_全文)

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CITATION:

Ohta, Itaru. Livestock Individual Identification among the Turkana : The Animal Classification and Naming in the Pastoral Livestock Managemen. 京都大学, 1986, 理学博士

ISSUE DATE:

1986-03-24

URL:

<https://doi.org/10.14989/doctor.k3449>

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学位申請論文

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Livestock Individual Identification among the Turkana:
The Animal Classification and Naming in the pastoral
Livestock Management

学 位 審 査 報 告

氏 名	太 田 至
学 位 の 種 類	理 学 博 士
学 位 記 番 号	理 博 第 号
学 位 授 与 の 日 付	昭 和 年 月 日
学 位 授 与 の 要 件	学 位 規 則 第 5 条 第 1 項 該 当
研 究 科 ・ 専 攻	理 学 研 究 科 動 物 学 専 攻
(学 位 論 文 題 目) Livestock Individual Identification among the Turkana: The Animal Classification and Naming in the Pastoral Livestock Management. (トゥルカナ族の家畜の個体識別 - 牧畜民による家畜管理における家畜 の分類と個体名付与 -)	
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(論文内容の要旨)

東アフリカの牧畜民が家畜に関する豊富な分類語彙をもっていることは、1930年代の古典的モノグラフによって明らかであるが、それが彼らの日常生活とどのような関係をもつのかといった点に関して掘り下げた研究はほとんどなかった。申請者の研究はこの点に着目して、ケニア北西部の乾燥地域に住む牧畜民トゥルカナ族の家畜をめぐる分類体系と個体識別ならびに命名の体系を、彼らの家畜管理技術や社会生活との関連において分析したものである。

トゥルカナ族は、家畜を発育ステージによって3段階に分け、さらにそれを性と家畜種によって30種類の異なる語彙によって表現している。そのほか、家畜の属性を分類するための、9つの基礎色彩語彙、14の体表の模様を表わす語彙、23の角型を示す語彙、7つの耳の型に関する語彙をもつ。さらにトゥルカナの28の父系氏族は、それぞれ独自の焼印模様をもち、それを自らが所有する家畜の右体表に焼鋏で捺す。また彼らは、数百頭におよぶ所有家畜のすべての個体を識別しており、搾乳個体と駄用のロバのすべてには個体名を与えている。申請者は、以上のようなトゥルカナの家畜分類と個体名付与の体系について精緻な記載をおこなったのち、これらの体系と家畜管理や社会生活との関連について観察をおこなっている。

まず、一つの家族が所有する家畜は、いくつかの日帰り放牧の畜群に分けられているが、その分割には性と成長段階の分類カテゴリーが重視されている。また、日帰り放牧における放牧群内の存否の確認に際して、トゥルカナは放牧群の全個体数をそのまま数えるのではなく、放牧群を数頭～十数頭からなるいくつかの確認単位に分けて、その中の1頭ずつの存否を確認するという方法をとるが、この確認単位への分割は、上記のさまざまな分類カテゴリーに基づいておこなわれている。さらに、このように家畜をグループとして扱う反面、たとえば搾乳のためには母仔の隔離と邂逅を反復させる必要が

あるが、その際に家畜の個体識別は管理技術上必須となる。これらの点をもとにして、申請者は、トゥルカナ族の家畜管理には家畜をある属性を共有する「類」として扱う側面と、独自の「個性」をもつ存在として扱う側面があることを指摘し、このような管理技術における二面性が、トゥルカナの精緻な分類体系と徹底した個体識別の基礎となっていることを結論している。また、東アフリカの牧畜社会では一般に牛の去勢オスと若い男性との間に1対1のアイデンティフィケーションが形成されるが、このような慣習も家畜の個性認識と不可分のものであるとしている。

家畜が野生動物に比して格段に豊かな個体変異をもち、そのことが個体識別を容易にしているのだが、その上に耳切りや角の矯正や焼印をほどこし、さらにヘテロな遺伝子をもつ種オスを残すことによって人為的に多様な形質的変異を求めていることを、申請者は指摘している。そしてこのことは、とくに個人の独立性の強いトゥルカナの人間性とも深く関連していると結論している。

(論文審査の結果の要旨)

東アフリカの遊牧民が家畜に言及する豊富な語彙をもっていることは, Evance-Pritchard がヌアー族について「あたかも銀河系のごとき語彙」と表現し, Gulliver もトゥルカナ族について同様な指摘をおこなっているが, その後この問題を深く追究した研究はなかった。申請論文は, トゥルカナ族についてこの実態の詳細を記載 分析するとともに, 家畜個体の類別と命名が家畜管理技術や社会生活とどのようにかかわっているかを考察したもので, 独創的な論文だといってよい。参考論文にも見られるように, 申請者は一貫して遊牧民トゥルカナの生態人類学的研究に専念してきたが, 申請論文はその本質に迫るための鍵の解釈といった内容をもっている。

本研究を進めるに当たって, 申請者はこれまでに誰一人試みたことのなかった方法を採用している。それは, 霊長類社会学の重要な方法と類似のもので, 家畜を個体識別して人々と家畜との関係を分析したという点である。申請者にこの方法をとらせたのは, トゥルカナの人々が自らが所有する数百頭にのぼる家畜の全個体を知悉し, 類別し, 命名していたという事実であり, 申請者自身が彼らと同水準の家畜の識別を達成しえてはじめて, 彼らの認知に近づきうると確信したからにほかならない。

家畜種ごとの性別と成長段階, 体色や模様などによる自然な特徴に基づく分類の体系は, すべての家畜個体をその体系の座標の上に位置づけることを可能にする整然たるものであることが示されている。さらに搾乳の可否, 去勢の有無による類別があり, 耳切り, 角の矯正, 焼印による, すなわち人為的施工による類別がある。各個体はこれらの類別特徴のいずれかによって言及特定されるが, 搾乳しあるいは駄用に供せられる個体には, 人々がその各個体に呼びかけるための個体名が付されている。このように家畜個々体の個体差を顕現せしめようとするトゥルカナの性向が, 種オスを残すに当たってヘテロな遺伝子をもつ個体を選択させているという事実が指摘されているが,

この点はトゥルカナ自身がそれについての明確な意識をもっていないとされるだけに、今後さらに追究されなければならない重要な意義をもっている。

申請者は、トゥルカナの上記の性向について、放牧群の全個体確認、搾乳、母仔の隔離、去勢その他いくつかの重要な管理技術、家畜授受の社会的慣習、特定家畜と個人とのアイデンティフィケーション、そして彼らに普遍的な基本的人格といってよいとくに強い個人の独立性などとの関連で優れた考察をおこなっており、それらが単純な機能主義的理解を越えたものであることを示している。人間にとって、一般に動物は無名の存在であるが、家畜とくに乳用家畜というカテゴリーがけっして無名ではないという実態をこれほどまでに鮮明に画き上げ、この世界をわれわれの理解の俎上に乗せただけでなく牧人と家畜のかかわりをここまで深く掘り下げた研究は、本申請論文を置いてかつてなかったといってよい。

よって本論文は、理学博士の学位論文として価値あるものと認める。

なお、主論文及び参考論文に報告されている研究業績を中心とし、これに関連した研究分野について試問した結果、合格と認めた。

Livestock Individual Identification among the Turkana¹:
The Animal Classification and Naming in the Pastoral
Livestock Management

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Dec., 1985

ABSTRACT

This paper analyzes the relationship between man and livestock through the examination of the livestock classification system and naming of individual animals among the Turkana, northwestern Kenya.

In the Turkana's management system, livestock are treated as classes according to their attributes based on the classification system. The notion of distinct individuality is irrelevant to this kind of treatment. On the other hand, individual identification of livestock is indispensable not only to the livestock management, but also to maintaining the human social relationship, which is mediated by livestock transfer.

The former aspect is examined through analyzing livestock classification system. In the Turkana's classification system, a stress is put on the five domains: coat color, horn shape, ear shape including ear markings, age-sex, and brand marks. The management techniques relevant to producing categories of the livestock are described and analyzed.

The method is described to check the presence of the members of a herd (195 goats) which are managed together in day-trip herding. The total herd is divided into several small units, and the members of each unit are checked one by one. The Turkana selectively apply several attributes of livestock for the unit formation. This division of the herd can be regarded as a livestock classification in a specific situation. After being divided into units, all the individuals are checked one by one. In this checking, livestock are treated classed by being divided into small units, and also as distinctive individuals by being checked one by one.

The aspect of livestock individuality is examined through the giving of individual names. The Turkana give proper names to all the parous females which are milked. Etymologies of 350 names are examined. All names refer to certain attributes of the named subjects. While livestock have many attributes, only one attribute is referred to in most names.

The significance of individual identification in pastoral societies is discussed. It is important functionally, because people should make the pairs of mother and offspring encounter after the separation during a day-trip herding, for milking the mother and for the offspring's nutrition. Individual identification of livestock has close connection also with the social relationships which are created and sustained by

livestock transfer. Each transfer can be regarded as distinctive only when each transferred individual is identified as an irreplaceable unique animal. Livestock individuality is discussed also in relation to the identification between man and cattle in East African pastoral societies.

[livestock classification, livestock naming, livestock management, Turkana]

1. Introduction

Linguistic profusion in the domain of livestock among the East African pastoralists is well known by anthropologists. Evans-Pritchard (1940:48) pointed out that the Nuer have "a galaxy of words" to describe the variations in coat color, horn shape, ear cut and age-sex categories, etc. of cattle, and that such an enormous number of terms are used by the Nuer in their everyday life. Gulliver (1951), who studied the Turkana, also stated that the Turkana have a large number of discriminating terms which enable them to distinguish and make reference to any two animals which look all the same to Europeans.

Evans-Pritchard (1940) stated that the richness of terms among one people in particular fields offers the key to understanding the direction and strength of their interests. To study such vocabularies is not merely a linguistic inquiry into the pastoralist's techniques for describing and referring to the individual livestock. For pastoralists, livestock not only provide them with the means of livelihood, but they are the medium of human social relationships, and they play an important role in their religious life also. Through the explorations of the vocabularies, we can find the clue to understanding man's social and religious life. Since Evans-Pritchard, however, studies of livestock vocabularies have made little progress for East African pastoral societies.

Many terms are applicable to one specific individual, discriminating it from others in a herd. These terms appear in the poems on specific animals, referring to their distinctive features. They, however, are not, at least originally, the individual names of the referents, but they are

classificatory terms for describing livestock. For example, "spotted [cow]" or "gray heron[-like ox]" can refer to specific individuals depending on situations, but there are many animals which fit to these categories. These terms, as well as "black", "red", "dotted", "striped", etc., belong to the classification system which draws definite lines in the continuous variations in the coat color of animals. People classify livestock also by other traits, such as horn shape, age, sex, etc. Linguistic profusion in the livestock classification among pastoral peoples can be recognized as originated from the complicated process of classification.

Human classification system of natural surroundings has two aspects: (1) A part of the given difference becomes to be recognized as to have some meanings for humans and classified, and (2) humans themselves actively produce differences in the subjects by working upon them. In case of livestock, however, the latter aspect is more important than the classification of wild organisms, because people create and maintain various differences in livestock in the process of keeping and managing them for their life.

Each category in the classification system has its distinct traits, and individuals receive a set of treatments just because they belong to certain categories. Livestock classification system has close relation to their actual management, each category being accompanied by its corresponding treatments. Aspect of the "class" comes to the fore.

On the other hand, there is another aspect of livestock in which each animal is treated as a distinctive "individual". The Turkana give proper names to livestock. The terms used as proper names are originally classificatory. From many terms equally applicable to a specific individual, one is chosen to give it the proper name. In the naming, it is shown what kind of animal attributes the Turkana care, how the classificatory terms are changed into proper names, and how proper names differ from descriptive referring to specific individuals.

In this paper, I describe the Turkana's relationship with livestock, in above two aspects: they treat livestock as animals of "class" or "category", and as distinctive "individuals".

2. Livestock classification

2-1. Age-sex classification

2-1-1. Livestock in the Turkana's animal folk classification

Turkana classify the animal kingdom into the following five categories:

- (1) itwan (pl. ngitunga): humans,
- (2) etiangit (pl. ngitiang): mammals,
- (3) ikeny (pl. ngikeny): birds,
- (4) ibore (pl. ngiboro): others,
- (5) ebarasit (pl. ngibaren): livestock.

The category (2) roughly corresponds mammals, although it includes crocodiles and do not include bats which are classified into the category (3). The category (4) includes all animals other than humans, mammals, and birds. The term for this category, ibore, means "thing" generally. In contrast to other four categories which are clearly defined, this category is, in its nature, a complimentary set, extracted by excluding the other four categories from the universal set of animals. The category (5) of livestock includes only five domestic animal species, i.e., cattle, camel, goats, sheep, and donkeys. This category is distinct from the category (3) of mammals.²

2-1-2. Basic classification

The Turkana classify livestock according to the differences in sex and developmental stages. Fig. 1 shows the age-sex classification of five livestock species. Three stages (I-III) are educible in both males and females of all species.

In stage I, males and females are not differentiated and put together. The term for the category has a neuter gender prefix. Of course, the Turkana are aware of the sex of each animal in this stage, and when the discrimination is necessary, -lokile [male] and -naberu [female] are added to the ending of the term in this stage. Probably the sex difference is not of great consideration for the Turkana in the actual management of the animals in this stage.

Each animal grows from stage I to stage II. The boundary between these stages, however, is not clear. Both males and females begin to be referred to by the term of stage II slightly before sexual maturity.

It depends on the situation whether an animal on the boundary is designated by the term of stage I, or by the term of stage II. For example, when the issue is the relation with the mother, even animals large enough to be referred to by stage II terms are designated by stage I terms. In other words, the animals of stage I are small and/or they are the offspring in relation with the mother in question. The term ikoku (which means child when applied to humans) is used to define an animal's attribute as "the offspring of so-and-so".

Males and females are discriminated in stage II, and referred to by different terms which have the corresponding masculine and feminine prefixes, except for cattle. Animals in stage II include males which are regarded by the Turkana to be large enough to impregnate females, males which are too small, females large enough to be pregnant, and females still too small. The Turkana do not have any exact term for sexual maturity. The expressions close to it is "to mount females" for males and "to be mounted" or "big enough to become pregnant" for females. What draw Turkana's attention are the copulation and resulting conception.

All the terms for males in stage II include la-ngitou. Ngitou (sing. etout) means testicles, and la-ngitou can be translated as "those which have testicles". This term shows that the Turkana pay attention to the male castration. Since the reproducing males also have testicles, la-ngitou must be defined in contrast with the male categories in stage III. This category, la-ngitou, can be strictly defined as "males with testicles which is not under the consideration to castrate or not".

In contrast, iwanitai in stage II are those males which will be castrated in future. The decision is already made: they are not to be selected as reproducing males. Males in this category are in more developed stage than those of la-ngitou of whom the decision has not been made yet. Iwanitai is used only in such restricted context as to ask whether the decision is already made or not on non-castrated males. La-ngitou, on the other hand, is a term to ask whether the subject of discussion is a large male in stage III or a small male in stage II. Therefore, la-ngitou and iwanitai are not exclusive of one another.

In contrast to the shift from stage I to II, which depends on a rather vague criterion of the degree of development, the boundary between stages II and III is clear in both males and females; selection of reproducing males and castration of others in males, and parturition and milking in females.

The males in stage III are composed of reproducing males and castrated males. The Turkana castrate all the male livestock except for a few reproducing males. The reproducing male is a selected animal, and differs from the sexually matured non-castrated males. At least in northwestern Turkana, where I made intensive study, the males once selected as reproducing males are not castrated even when they grow too old to reproduce. They will be slaughtered for various reasons, but not castrated.³

They have three castration methods: (1) cutting off the seminal ducts inside by beating with a wooden hammer (Fig. 2), (2) removing testicles and seminal ducts after cutting open the scrotum with knives, and (3) biting off the seminal ducts inside without shedding blood.⁴

The Turkana enumerate the purposes of castration: males will grow fat, acquire resistibility to the dry weather and lack of water, become docile and easy to be handled. Castration is also practiced for the treatment of some diseases (Ohta 1984).

Among goats, I observed the Turkana castrate a male newly joined to the herd by exchange, in order to prevent it from being lost while herding. They say that newcomers to the herd are apt to stray because they are surrounded by unacquainted goats, and that the operation functions to reduce the newcomers' activity by giving them pain.

The autonomous integration of a livestock herd is considered to be reduced in the breeding season (e.g., Tani 1976). When the herd contains many males, some animals will be lost because the herd would be disturbed by rutting males. The Turkana say that such situation occurs only in donkey herds, and their opinion varies about herds of other livestock species. In non-breeding seasons, the castrated males tend to graze together with females and young immature males more frequently than reproducing males (Ohta 1982). Castration of males apparently enhance the herd integration, at least, of goat herds, although the Turkana do not have any conscious purpose to modify the association pattern of goats.

Castration is closely related to their social life, in that only castrated males are exchanged with nulliparous females, and that the sacrifice in some rituals is restricted to castrated males. Some of the castrated males become the favorite animals of the owner (Gulliver 1951). The chief subject of "identification" (Seligman & Seligman 1932) of a man with the livestock, is the ox, although males of goat and camel can become its substitutes. Akiduwar means "to make an animal as one's favorite one" in the Turkana language, and the subject is referred to as "emong [ox] lo-duwarit", if it is an ox.

The criterion to distinguish the stage III females from those of stage II is whether they have been milked or not after the parturition. The Turkana do not directly control animal reproduction except for the male castration, although for goats and sheep, they sometimes help males copulate by holding estrous females down. The seasonal change of parturition directly depends on the fluctuation in vegetation, which affect the female nutritive conditions.

Females in gestation are classified into three stages. The Turkana's description of each stage are as follows:

- (1) Akikap: gestation is proved by the swollen belly of the females. The nipples and breasts do not show apparent change yet. If aborted in this stage, the baby is hairless.
- (2) Akiwochun: the belly of a female in this stage is swollen as if the female's stomach were full even in the morning before grazing, which makes a clear contrast with the bellies of non-pregnant ones. The nipples begin to protrude. If aborted in this stage, the baby has hairs on the head, and at the tips of legs and tail.
- (3) Akitaalak: the belly swells larger, as well as the breasts. The premature infant sometimes survives. This stage lasts until the normal parturition.

Table 1 shows the duration of each stage. The Turkana have the lunar calendar, and they answered to my question on the duration in figures. They have clear ideas on the gestation period of the animals. However, they do not depend on figures when they judge the gestation stage. They classify pregnant females by the observable physical signs.

Among the three terms mentioned above, akikap has the general meaning of "become pregnant". This term is applied only to non-human animals.

What is emphasized by this term, when applied to females in the first gestation stage, is not the stage itself, but the fact that the concerning individual is pregnant. In this regard, this term differs from the other two. In short, a pregnant female in the early stage is described only as "it is pregnant".

Even after giving birth, a female is classified into the stage II if all parturitions have been still-births and the female has not been milked.⁵ After being milked, the female is put into stage III, even if the offspring have died. For donkeys, which are not milked among the Turkana, the criterion is giving birth to thriving offspring. The sterile females of all livestock are called ngakolupai (sing. akolupat). This category is not mutually exclusive with female categories in stage II, but forms a part of them.

The females in stage III, in the context that milk production⁶ is the central issue, are classified into the following three categories: a female which has babies and is lactating (amanangit, pl. namanang),⁷ a female whose offspring died after birth but is lactating (aarakan, pl. naarakanin),⁸ and a female which is not lactating (aonikinit, pl. nakoonikinok). The criteria of this classification are milking and presence of babies. These three categories are independent of one another. They are applied to all livestock except for donkeys, and form the infra-category of females in stage III.

2-1-3. Distinction between large and small livestock appeared in the terms for age-sex categories

The examination of the terms in Fig. 1 reveals that the Turkana distinguish large (cattle, camels, and donkeys) livestock from small ones (goats and sheep). For stage II females, the cattle terms are applied to camels and donkeys, while the goat terms are used for sheep. The Turkana divide livestock into two categories, i.e., large and small livestock, although they do not have classificatory terms for them.

The term (ataok) for the heifers in stage II, which are young and not milked yet, is applied to camels and donkeys of the same stage. In the case of cattle, ataok forms a pair with aite (stage III). In contrast, ataok makes a pair with aapolon (which means "large") among camels and donkeys. Even for cattle, the expression of "aite ataok" is sometimes

used. This expression, however, stresses that the animal concerned is a cow, but not a camel or donkey. When people say simply ataok, it signifies the cow in stage II, and not that of stage III.

The same usage of the term appears among goats and sheep. The term (akale), which originally means female goat in stage II, is also applied to the sheep of the same stage. Akale is the counterpart of engine among goats, whereas it coordinates with aapolon among sheep.

Goats and sheep are sometimes lumped together without distinction. This is reflected in the Turkana's general term which means goats. This term (engine, pl. nganginei) also implies the category composed of both goats and sheep. When it is necessary to indicate that the concerned is a goat but not a sheep, the term ameot (pl. ngamee) or engine nameot is employed.

2-1-4. Uniqueness of cattle and goats in the terms for age-sex categories

Next point is that classification of cattle and goats are unique compared with that of the other livestock. Terms for stage II females of cattle and goats are composed of one lexeme, while of two lexemes for other livestock.

The same uniqueness is shown in the term for stage III males of cattle. Both reproducing and castrated males in stage III are referred to by one lexeme for cattle, while by two lexemes for others. The term for the reproducing male of cattle (emaanik) is also applied to wild animals. That is, this term also means "males (of adult animal)" generally. Its use is restricted to adults because it contains the notion of reproducing. There are other terms to signify the sexes of newborns, lokile for males, and naberu for females (for humans, losapat for males and naberu for females).

The term (loketepan) for reproducing males of other livestock is derived from akitep, which means "to mount (females)", and the term (lodongong) for castrated males is a derivative from akidong [a method of castration, see footnote 3].

The term for the cattle of stage I (ngitak) is also applied to wild animals, meaning "the young ones" generally. Further for cattle, males of stage I and II are referred to by the same term, while it is males of stage II and III which are called by the same term for other livestock.

The uniqueness of goat classification lies in that the term of stage II and III males (ekoroi) is completely different from that of females. For camels, sheep, and donkeys, the difference between male terms and female terms appears only in the gender prefix, with the stem of term being entirely the same.

In the Turkana's management of each livestock, there is no apparent difference which would correspond to the uniqueness of cattle and goat classification system. In the actual management, donkeys are unique; they are not milked but used as pack animals. Other livestock are dealt with under the same system. The origin of uniqueness in cattle and goat classification does not have its origin in the present management.

2-2. Classification of coat color

Domestic animal species which maintain color variants polymorphically have wide coat color variations. These variations are due to that the pressure of natural selection has been lowered under the artificial condition, and that the latent genetical variation has surfaced (Zeuner 1963).

The Turkana have a huge vocabulary to describe the various coat colors of livestock. They, however, do not have terms to signify "color" or "pattern" abstractly. The Turkana say, when asking the color of animals, "Aiyes hai", which literally means "what kind of appearance?" This phrase also applies to human appearances. When they want to specify animals, they say "Aiyes ngajuru [animal fur] hai?"

The concepts of "color" and "pattern" are indivisible and continuous for the Turkana, although they are separated for convenience in the following description.

2-2-1. Terms of "color"

Turkana terms of "color" and the focal manifestation of each term are:

- (1) -aakwan: white,
- (2) -kiryoona: black,
- (3) -aaryangan: red,
- (4) -nyang: yellow or orange,

- (5) -ngori: gray or grayish brown,
- (6) -kipurat or -bok: pale reddish purple,
- (7) -pus: blue, green, or yellow-green,
- (8) -mugi: purple.

These nine terms will be referred to as "color terms" in the following descriptions. All of them are utilized when referring to the animal coat color. It may be curious that the Turkana apply such terms as red, blue, and purple to the animal coat color. However, what is important for application of these terms is the relative tone of colors. Even to camels and donkeys, whose color variations are not so great as among cattle, goats, and sheep, the Turkana apply all of the nine terms. The chromatic extent of each terms' implication, although I do not analyze it here, is almost the same with that of the Nyangatom's color terms (Torney 1973), whose language differs from that of the Turkana only at the dialect level. The sole difference is that the Nyangatom apply the term -bok only to animal fur color (Torney 1973), while the Turkana apply it to everything⁹.

2-2-2. Terms of "pattern"

There are various patterns of color combinations on the livestock bodies, especially among cattle, goats, and sheep in East Africa. Although several anthropologists reported the classification systems of color configuration in East African pastoral societies (Evans-Pritchard 1940, Dyson-Hudson 1966, Torney 1973, Fukui 1979, Turton 1980), none of them fully discussed how the terms are applied to animals.

The Turkana have sixteen terms to refer to color configurations. Fig. 3 shows the focal manifestations of each term. I will call them "pattern terms" hereafter.

These terms do not refer to the specific part of bodies, but to the distribution of colors as a whole on the animal body. These terms are used differently from the expressions for referring to animal color by utilizing general terms for animal body parts, which will be called "body-terms" hereafter.

2-2-3. Coat color variation and how to refer to animals

The Turkana refer to coat color of livestock by the color terms, pattern terms and other terms. The usage of the terms at the time of

referring to animals are summarized into nine categories:

- (1) one color term,
- (2) combination of color terms,
- (3) one pattern term,
- (4) combination of color and pattern term,
- (5) combination of pattern terms,
- (6) combination of color term and body-term,
- (7) combination of pattern term and body-term,
- (8) terms which refer to wild animals,
- (9) other terms whose usage is restricted to animal coat color only.

Each category will be explained in the following. All the referrals to animals are accompanied by gender prefix (in singular form, lo:- masculine, na:- feminine, ni:- neuter; see Dimmendaal 1983) appropriate to the referents.

(1) An animal whose coat color is uniform is described by a single color term.

(2) An animal which has uniform coat, and the color falls between two categories of the Turkana's color classification, is described by a combination of two color terms. Although combination of more than two terms is theoretically possible, I did not observe such a case.

(3) For analyzing the usage of pattern terms, it is necessary to distinguish between four terms (-meri, -kori, -ngorok, and -komoli; see Fig. 3, A1 and A2), and other pattern terms. The four terms are different from others. The patterns signified by both -meri and -kori are the same; they are approximate to the "dotted pattern" in our concept. However, while -meri is used when the color of dots on the white ground is -kiryoon [black], -pus [blue and green], and -mugi [purple]; -kori is used when the color of dots is -aaryangan [red], -nyang [yellow], -ngori [gray], and -kipurat (or -bok) [pale reddish purple]. The same applies to -ngorok and -komoli, the former corresponds to -meri, and the latter to -kori. These four pattern terms partially include the notion of the "color" inherently. For example, the Turkana do not use -kori, but -meri for the color pattern of black dots on a white ground. This usage shows that the Turkana classify the color terms other than -aakwan [white] into two covert categories: one for which -meri and -ngorok are applied, and the other for

which -kori and -komoli are applied.

Normally, these four terms are accompanied by the color term which signifies the color of dots and spots, but when dots and spots are -kiryoona [black] or -aaryangan [red], the color term is not added to pattern terms. For example, when the Turkana refer to an animal simply as lo (masculine prefix) -komoli (Fig. 3, A2), the animal's coat color is the spotted pattern of white and red. This usage shows that the "black" and "red" occupy different places from other colors among the Turkana.

(4) The combinatorial use of color term and pattern term can be classified into three.

4A: In the case of four patterns above, the animal is described by combination of color and pattern terms, when the color of dots and spots are other than "black" and "red". The order of terms is pattern term + color term.

4B: The above-mentioned four terms are followed by the term -aakwan [white], when the dots and spots are not vivid.

4C: In the case of the other patterns (Fig. 3, B1-B12), the pattern term is followed by the color term which denotes the color other than white.

(5) The four pattern terms mentioned above sometimes follow other pattern terms. When the parts other than white in the patterns of B1-B12, in Fig. 3, are not uniformly colored but spotted or dotted, the four terms play the same function as the color terms in 4C. For example, an animal described as na [feminine gender prefix]-linga-meri has the pattern of -linga [pattern term, Fig. 3, B5], with the colored part being -meri [dotted, Fig. 3, A1].

(6) Color configurations of animals are also referable by the body terms. The body parts referred are: head (akou), ears (ngaki), nose (ekume), under part of the neck (etole), breast (erarum), hump (aruk), waist (aabor), foreleg (akuwat), hind leg (amuro), and tail (ekosim), etc.

The body terms are obviously different from the pattern terms. This is manifested in the term usages, i.e. in their relative positions when they are combined with color terms. The body terms follow the color terms, referring only to the specific part of the body where the conspicuous characteristics appear, while the pattern terms precede the color terms. For example, a white ox with a black head can be described as lo [prefix]-kiryoona [black]-akou [head], as well as lo [prefix]-linga [pattern term,

Fig. 3, B5]-kiryoon [black]. Gulliver (1951) listed some Turkana terms of animal coat colors, but he did not distinguish between pattern terms and body terms, placing the pattern terms as to refer to a part of body. Pattern-terms refer to the distribution of colors on the whole body, and are also applicable to things other than animals.

(7) The four terms in (3) are used in the place of color terms in the representations explained in (6). For example, a cow with dotted ears is referred to as na [prefix]-meri [dotted, see Fig. 3, A1]-ngaki [ears].

(8) The coat color of livestock is sometimes compared to that of wild animals, and livestock is referred to by the terms of wild animals. Wild animals which appear in the representations of livestock coat colors are; elephant (etom), hunting dog (epeyot), lion (engatuny), spotted hyena (ebu), leopard (eris), kudu (esarishi), zebra (etuko), Grant's gazelle (agete), buffalo (ekosowan), ground squirrel (ekunyuk), turtle (aboko), puff adder (akipom), and a species of snake (aleu), etc. The term usage in the descriptive reference (not in the individual names) takes the following three types.

8A: The terms of wild animals are combined with the terms of livestock categories. For example, the ox (emong) whose color resembles that of hunting dogs (epeyot) is referred to as emong-lo-peyot. This ox can be also referred to as lo [prefix]-wazi (Fig. 3, B12)-kiryoon [black].

8B: By the word koni [look like], the ox illustrated in 8A can be similized as emong-koni-epeyot. When the coat color itself, not the animal, is in concern, the color of the above ox is described as lo [prefix]-wazi (Fig. 3, B12) -koni [look like] -epeyot [hunting dog].

The frequency of these terms in the everyday descriptions of livestock, however, is not very high, although they are commonly featured in livestock individual names and in ox-songs.

(9) The following terms which refer to livestock coat color, can fit to none of the above categories.

9A: -cherya represents the agouti color of goats (wild type, Searle 1968) which is a combination of black and brown.

9B: -yara can be applied to those who has the -aaryangan [red] face. This term originally means the girls' make-up by red clay.

9C: -ngorya is applicable to those whose head is spotted by -aaryangan [red] and -aakwan [white], although its etymology is unknown. This

term may be classifiable as a pattern term. However, while pattern terms above mentioned can combine with several color terms, this term can be followed only by -aaryangan [red]. In short, this term signifies only one kind of color configuration.

9D: -sia signifies the color of roan. This term functions just the same as the color terms, although this term is applied only to the animal coat color.

9E: -ngiro refers to the color which continuously turns from black to dark brown or dark gray, from the head to the chest.

9F: -ama signifies the coat color which includes more than two colors besides white, and forms complicated color.

All the coat colors classified above can be applied to cattle, goats and sheep. Camels and donkeys have rather uniform color. Even for them, the Turkana read the delicate difference in their coat color, and extensively apply the color terms.

The distribution of livestock coat color in the populations is influenced by the selection of reproducing males. The Turkana select only a few males as reproducing males. At the time of selection, what kind of attributes of males are taken into consideration? By interviews, however, I could not detect clear standards. When asked, almost all the Turkana mentioned the body size at first. Males which have wide haunch, with large belly and hump are suitable for reproducing, according to them. None of the informants alluded to the quality of the mother.

Some informants mentioned the coat color. Each of them said that he was fond of such and such a color, and that many offspring of the color would be given birth by the males of such color. This explanation, however, refers only to his individual preference, and it does not mean that males of a certain color are qualified for reproducing males essentially. Judging from their explanations, they do not regard males of any color as the common standard for reproducing males.

However, they tend to choose reproducing males so as to maintain a high color diversity in the herd. The coat color variation is conspicuous among cattle and goats. For cattle, the Turkana are inclined to choose, as reproducing males, those whose genes of coat color might be heterogeneous and include various recessive genes¹⁰. For goats, there seems to be no

tendency that males of any specific genotype are chosen. Goat herds are normally larger than cattle herds and include more reproducing males. Seemingly people choose several reproducing males of different colors, which results in the diversity of coat color in a herd, although the Turkana do not speak of this explicitly.

Then, why the coat color variation in a herd should be maintained?¹¹ The Turkana themselves do not explain it. One of the keys to its interpretation is the "identification" relationship between men and animals, in which a man develops specific relations with specific castrated males. This relationship is formed not only between a man and specific animals, but also between him and the specific color of the identified animals.

There is no explicit rule for the formation of the tie between men and colors. But there is a clear tendency that full- and half-brothers who have been brought up together, choose different colors from one another. For example, among two full brothers and their half brother, identified colors of each of them are completely different from one another as follows: A, -aaryangan [red]; B, -lukwa (Fig. 3, B6); C, -komoli (Fig. 3, A2). Perhaps each man in his boyhood develops the tie with a particular color different from those of his brothers.

Usually one livestock herd, which forms a reproducing population, is not owned by a single man but composed of animals of several men who are brothers. The several owners jointly constitute a herding unit. They identify themselves with significantly different colors from one another. It can be said that the Turkana choose such reproducing males as to produce animals with the color peculiar to each owner. The relation between men and animal colors constitutes one of the channels along which the livestock transfer occurs. A man can beg his close relatives or friends for animals of his color.

2-3. Classification of horn shape and the reforming technique

Horn training of oxen among East African pastoralists dates back to the Ancient Egyptian Era (Seligman & Seligman 1932). The custom is widely distributed in Sudan, Ethiopia, Kenya, and Uganda (Nandi: Hollis 1909/1969,

Pokot: Beech 1911/1969, Nuer: Evans-Pritchard 1938 and 1940, Jie: Gulliver 1949, Bari and Mandari: Huntingford 1953a, Karimojong: Clark 1952 and Dyson-Hudson 1966, Dinka: Lienhardt 1961 and Grunnet 1962, Dodoth: Thomas 1965, Murle: Lewis 1972, Dassanetch: Almagor 1972). The Turkana also train horns of castrated males of cattle and goats.

They have twenty-six terms for describing the horn shapes of cattle, goats, and sheep. These terms are applied not only to artificially formed horn, but also to untrained horns, in which variations occur naturally. Classification of horn shape does not necessarily accompany the training techniques; for example, the Maasai, who do not practice it, classify the shape of cattle horns into five categories (Jacobs 1965). The richness of the Turkana's vocabulary in their horn shape classification, however, seems to be related to their exercise of horn training.

Among the twenty-six terms, etymologies of eight terms are detected (Table 2). Other terms do not contain meaningful elements; they are the very terms to signify particular horn shapes. The horn shapes are classified into eighteen, because some of the terms are synonyms for the same shapes (Fig. 4).

Horn training is connected to man's selection of specific oxen as their favorite ones. Each adult man has his favorite shape, into which he trains the horns of his oxen. A man does not always select only one specific shape, but only a few have more than one favorite shape. The selection process does not follow any particular routine. Men just choose shapes which suit their tastes. Horns of castrated goats are also trained.

The training techniques are roughly grouped into the following three.

(1) akiram: this term means "to beat". When the horn has grown to a certain size, the part near the base is beaten by stones and the horns are bent to the aimed direction to break the core. A shallow gutter is cut on the horn at the tip and a string is tied to it. The other end of the string is, then, tied to the other horn, or to the cut made in the hide, to fix the horn in the aimed direction. The core of the horn cures in the due course.

(2) akidung: this means "to scrape". One side of the horn is scraped by knives or spears. Then the horn bends to the opposite side of the scraped surface, as the horn grows. This may be due to the abnormal growth of the bone cells in the scraped part.

(3) akimad: this means "to foment". When the tip of a horn comes out, a heated branding iron is pressed to it to prevent growth of the horn, which results into hornless.

The Turkana do not have any general term for horn training. The trained horns are always recognized concretely by the above treatments. When the subject is not the trained horns but the methods of the training, the trained horns are described as eramitai (trained by akiram), edungitai (by akidung), or emaditai (by akimad). Each of them contains several horn shapes in it. These terms, however, do not constitute any upper category of horn shapes.

Each of the above treatments produce several horn shapes. It may be tentatively viewed that the Turkana train animal horns in eleven ways by various application of the three techniques (Fig. 5). Note, though, that the Turkana do not assume such classificatory relations among the training ways as is presented in Fig. 5. For them each training way is independent. One animal, if horn-trained, receives only one of them.

Each training way is closely related to a specific horn shape in Fig. 4. The treatments other than the burning off with branding iron are exercised at 2-3 years for cattle and at about 1 year for goats. At the time of treatments the horns are half grown. This shows that the training methods are to set the direction of the horn growth after the operation, and that they are not to bend developed horns or to modify horns into particular completed shapes at the time of operation. Therefore, several horn shapes sometimes result from the same training way as in the case of way-IV in Fig. 5.

All the horn shapes produced by the way IV are called generally "kodos", when no detailed classification is necessary. The other four terms which are applied to the horns produced by the above method, have definite etymology; they are originally graphic terms for describing the shapes (see, Table 2). These facts suggest that the four terms are infra-categories of -kodos. In Fig. 4, the differences are emphasized among the horn shapes referred to by these terms (No. 4-8), although they are in fact continuous.

The differences between the ways VIII and IX in Fig. 5 are only the degree of scraping; horns are scraped more deeply in the former. The Turkana, however, stress that these two are different ways of training, and

that they can manipulate the techniques to attain the aimed shapes. Each of the eleven ways of training corresponds to a specific horn shape. The Turkana's operations are considerably precise to achieve the aimed horn shapes.

There are great variations even among untrained horns, and the Turkana classify them in detail. Table 3 shows that each horn shape in Fig. 4 is formed artificially and/or naturally.

Only four horn shapes are unattainable naturally. Three of them are the derivatives of -kodos, and the other is hornless. Whether an animal becomes horned or polled follows the Mendelian law of heredity, and the polled is dominant. Since there is no naturally hornless animal among the Turkana, the whole population in their country has only the subordinate, horned genes.

Nos. 17 and 18 in Table 3, are not artificially shaped, but formed accidentally. No. 17, which is the shorthorn, includes those which have grown dwarf horns after the operations to be hornless. There are also some individuals whose horns are naturally short. No. 18 is the broken state of developed horns. Only No. 16 is not produced artificially or accidentally, but achieved by natural growth of the horns.

In short, (1) most of the horn shape categories in the Turkana's classification system have the corresponding techniques to achieve them, and (2) almost all the categories include both artificially produced horns and natural horns.

Each horn shape is regarded both as the result of the given natural phenomena, and at the same time, as obtainable artificially. This point is different from the classification of coat color of livestock; the variations in the coat color can be regarded as a natural product, excluding the effect of selection of reproducing males, and that the color is impossible to modify on the level of individual animals.

Their developed techniques of horn training is not unrelated to their rich classificatory categories of horn shapes. The techniques support the detailed classification, and vice versa. Almost every horn shape category has its corresponding technique to achieve it. This seems to suggest that what is classified by the Turkana is not the variations in the horn shape but the techniques of horn training. However, the Maasai, who do not practice horn training, also have classification of horn shape variations

caused naturally. Therefore, the horn shape classification by the Turkana cannot be regarded as the classification of the training techniques. When the Turkana classify the horns of a non-operated animal into a certain category, they are not conscious of the techniques to achieve that horn shape of the animal.

2-4. Ear marking and classification of the ear shape

Livestock ear shape modification by trimming and slitting is widely distributed among East African pastoral societies. Most of them practice this as the marking of clans, lineages, and individuals (Nandi: Hollis 1909/1969, Bari: Beaton 1936, Toposa: Nalder 1937/1970, Kipsigis: Peristiany 1939, Pokot: Huntingford 1953b, Iteso: Lawrance 1957, Baraguyu: Beidelman 1960, Sonjo: Gray 1964, Maasai: Jacobs 1965, Rendille and Samburu: Spencer 1973, Dassanetch: Carr 1977, Pari: Kurimoto 1980). Livestock ears are also cut as the treatment of diseases (Luo: Odede 1942, Turkana: Ohta 1982), and at the time when a man has killed members of neighboring tribes (Karimojong: Clark 1952, Dassanetch: Almagor 1972).

The Turkana also modify the livestock ears by making slits and trimming. The modifications are classified into seven categories (Fig. 6). Both ears of an animal are cut in the same way in some cases, and in the different ways in others. It is rare to make two different cuts on the same ear.

The reasons for cutting ears are summed up in the following five categories.

(1) Markings in association with individuals' general welfare: The marks same as that of the mother should be put to newborns shortly after birth (about two weeks for goats and sheep, one month for cattle, camels, and donkeys). This is the first reply of the Turkana when they are asked why they put ear marks to livestock. To make ear markings of this kind is considered by the Turkana as a task of the family head, as well as castration and branding of clan marks (Ohta 1980). The Turkana state that by this marking, the newborns will be blessed with good health, not suffering from diseases, not straying off while herding. For newborns which are given birth after their mothers aborted repeatedly, both ears are

cut into emunitoi (Fig. 6, type 2). This, called amunyokin, is performed with the intention to protect newborns from the same fate with their precedents. Amunyokin is also practiced for humans. Upper part of the ear (normally the left) of a sickly human baby is slightly trimmed off in the hope of its health.

(2) Clan's ear marks: each Turkana clan has its own ear mark, and livestock bear the owners' clan marks. Epone (pl. ngiponei) means clan's ear mark. When asked "what is his epone?" the Turkana answer by the clan names. While marking of the owners' clan is made almost exclusively by branding, trimming of clans' ear marks is scarcely practiced. Most Turkana know only the clan's ear mark of their own, but not those of other clans. For the brand marks, they know marks of other clans very well.

(3) Decoration of castrated males: men sometimes trim the ears of their favorite males into favorite shapes. But, the trimming is not made freely. The styles are chosen from the types shown in Fig. 6. A man tends to choose only one type of trimming, although there are no inhibitions or rules like in the case of horn shape. Castrated males of sheep and donkeys do not become the subjects of ear trimming of this kind.

(4) Killing of enemies: the Turkana and the surrounding peoples raid one another. Men who killed members of other tribes in the raiding cut the ears of a part of his livestock into itebitai. In this case, the whole circumference is trimmed, differing from normal itebitai (Fig. 6, type 1). Those who killed such fierce wild animals as lions, leopards, hyenas, etc. also trim their livestock in the same way. Some males are exempted from the above mentioned war markings after birth, and their ears are kept intact.

(5) Treatment of diseases: the Turkana have a detailed classification system of livestock diseases, and as the treatment for some diseases they trim the tip of affected animals' ears (Ohta 1984). They say that the evil thing causing the disease gets out of the animal's body with the blood. There is no specific correspondence between the kind of diseases and the type of marking chosen.

Next, I examine the actual distribution of ear marks. Table 4 shows the ear mark distribution in goat herds. Herds A and B are the same herd in different study periods. 111 (1 male and 110 females) animals are

present in both herds. Herds C and D are managed together in the day-trip herding, but the owners belong to different clans. The clans of the owners are: Herds A & B - Esigeret (pl. Ngisiger), C - Epongait (pl. Ngiponga), and D - Emeturanait (pl. Ngimeturana).

Among the 562 individuals, ear marks are cut to 324 individuals (57.7%). The -muleles in Table 3 have extraordinary short ears inherently, and excluded from ear marking.

The frequency of emunitoi (Fig. 6, type 2) is highest in all herds. The reason for this is not clear. According to the owner of Herds A and B, the goat which founded his herd, had been given to him by his mother's full brother, and the goat had ear cut of emunitoi. He stated that the mark has been succeeded by its descendants. For Herds C and D, the reason for many emunitoi is unknown. The high frequency of a specific ear mark in one herd seems common among the Turkana. According to the life history of herd owners, however, there may be various reasons for the convergence.

In Herd A, a rush of parturition occurred in Sept.-Oct. 1982. Table 5 shows the frequency of ear cut among newborn kids in the end of November. The markings of newborns can be regarded to have been completed by then. Of 113 (61 males and 52 females) newborn kids, three (1 male and 2 females) are excluded from the analysis because they are short eared (-mulele) and their ears are not marked. The frequency of marked kids are significantly higher among the females than among the males. The Turkana stated that ears of males are kept intact for future cutting. Table 6 shows marked and non-marked goats in Herds A and B excluding kids. For the individuals found in both Herds A and B, the conditions found in Herd A are taken. Again, the frequency of marked individuals is significantly higher in the females than in the males.

The coincidence of ear mark types between the mother and the kid is examined among the kids mentioned above in a following way. Male kids are excluded because they are sometimes not marked by the reason above. Of the 52 female kids, two kids which are short eared (-mulele) and one whose mother is -mulele are excluded because it is impossible for them to discuss the mark inheritance. Of the remaining 49 kids, 27 (55.1%) have the same mark with the mother, and 22 (44.9%) have different one from that of the mother. This result may seem to suggest no strong coincidence of the same ear mark between the mother and its kids. However, the expected

probability that two individuals randomly selected from Herd A (Table 4) have the same ear mark is 0.288 ($f_i[f_i-1]/N[N-1]$; f_i = number of animals which has a certain ear type including non-cut, N = total number of animals). In the actual distribution of mother-kid ear marks, the frequency of coincidence is significantly higher than the expected value calculated from the ear cut distribution in the whole herd ($\chi^2=11.72$, $p<0.001$).

The Turkana do not have any conscious intention to put distinctive features to individual animals by ear markings. Ear cuts, however, function as indices for individuals, and the Turkana frequently refer to them. The vocabularies which refer to animal ears are summarized in Table 7.

The variation in the ear length, which also serves as distinctive features when referring to individuals, is classified as follows:

- (1) -mulele: ears of less than 4 cm in length,
- (2) -mudan: ears of 4 to 8 cm,
- (3) -ita-a-ngaki: ears longer than 8 cm (ita=tapering, ngaki=ears).

Most of the classificatory terms of horn shape do not have any meaningful etymologies. They are just the terms of horn shapes. Only a few terms have clear etymologies, originally graphic terms describing the horn shape. Such an expression of horns as eramitai [anyone which have been treated by akiram] does not constitute an upper category of various horn shapes formed by the same technique, but used in the situation to discuss the modification itself. By contrast, all the terms of ear marking in Fig. 6 have the form of imperfective non-past + passive (Dimmendaal 1983): "anyone which have been treated in a specific way, and it still holds for the present". The Turkana are conscious of the type of actions in the ear mark classification system. Differing from the horn shape terms, which classify the given (either natural or artificial) divergence, what is classified by the ear mark terms is the human action itself, or the process to achieve each ear mark, and not the shape of the completed ear.

2-5. Livestock brands

Among East African societies, livestock branding is widely distributed. Some brands convey the clans or sub-clans of the owners, others express markings of individual ownership (Gabra: Torry 1973, Dassanetch: Carr 1977, Almagor 1978, Pokot: Beech 1911/1969, Karimojong: Clark 1958 and Dyson-Hudson 1966, Nandi: Hollis 1909/1969, Datoga: Klima 1965, Tomikawa 1969, Maasai: Merker 1910, Rendille: Spencer 1973, Nyangatom: Torney 1981, Borana: Dahl 1979, Sonjo: Gray 1964, Baggara: Cunnison 1969, Jie: Gulliver & Gulliver 1953, Toposa: Nalder 1937/1970).

Among the Turkana there are twenty-eight patri-clans (Gulliver 1951). Each of them has its specific brand marks (emachar, pl. ngimacharin). The term ateger (pl. ngategerin), meaning a kind of wooden vessel, also denotes the clan in the Turkana language. The term, emachar, also denotes the clan and used more frequently than ateger when referring to the clan. The marking of the owner's clan to the livestock is almost entirely done by the branding, although each clan has its own ear marking (epone, pl. ngiponei) at the same time. Lynch and Robbins (1977) stated that wealthy men have individual brands of their own; however, I could not confirm such a custom in northwestern Turkana.

Animals are branded when they begin to be taken out for day-trip herding. The branding tool, made of iron with a wooden handle (Fig. 7), is called by the same term as the brand itself. The irons are heated in the fire, and pressed against animal bodies. The branding iron is made from the spear of a deceased family head. His spear, together with the stick (aburo, pl. ngaburoi) and stool (ekichorong, pl. ngikichorongo), is broken down at the time of inhumation. The Turkana say that the branding iron, as well as the wooden hammer for male castration, should be succeeded to from the father to his sons. Fathers give these tools to their sons when the sons set up their own homesteads.

Examples of the clan brands are shown in Fig. 8. Among some clans, males and females are branded in different ways from each other. Among others, brands for large livestock (cattle, camels, and donkeys) are different from those for small livestock (goats and sheep). When livestock are transferred to the men of other clans, the new owners brand the marking

of their own clan over the previous markings.

The Turkana consider that livestock branding should be performed by the family head, although others sometimes play his role when satellite camps are located far away from the main camp where the family head normally stays (Ohta 1980). At the time of branding, the family head speaks to the subjects: Tabarashi. Tochamunoshi ka ekusimachar lo. Tolimoshi ekusikokolan. Kisilereutu ekusikokolan lokinyamu esi. Taara ekapilan lokilimit esi ["Reproduce. Agree with this, your emachar. Tell us (who is) the thief. Prosecute the thief who eats you. Kill the witch (ekapilan) who talks about you]. The Turkana say that what matters is whether or not the animals agree (achamun) with the brand. If they do, they will grow in good health and the herd prospers, but if they disagree (akiger), they will die. The branding is considered by the Turkana to have some relationships with the total welfare of the branded animals. Clearly, livestock branding is not for practical purposes such as the individual identification.

Other than the clan markings, the Turkana brand the animals in order to decorate them. Branding of this kind is not called emachar [clan's branding], but akigir meaning "drawing". For cattle, both males and females with gray coat become the subjects of this decoration. The fur color of the branded area changes into black, which contrasts beautifully with the gray ground, say the Turkana. I observed that a castrated goat was decorated in the same way. Livestock decoration by branding is also reported among the Nandi (Hollis 1909/1969), Maasai (Merker 1910), Dodoth (Thomas 1965), and Karimojong (Dyson-Hudson 1966).

The Turkana brand livestock for treating some diseases (Ohta 1984). Branding of this kind is called akimad [to foment]. This treatment is also widely distributed among the Nandi (Hollis 1909/1969), Maasai (Merker 1910), Nuer (Evans-Pritchard 1938), Keyo (Massam 1927/1968), and Baggara (Cunnison 1966).

3. Structural grasp of the herd members

3-1. Ethnographic evidences that pastoralists do not count their animals

Every day livestock are driven out of the village for grazing in the morning, and taken back in the evening. The animals managed together in the day-trip herding are often numerous. The number of animals in one herd exceeds more than 300 individuals in some cases. The herders must closely watch the animals so as not to let them astray. How do the herders make sure that each herd member is not lost?

Some East African pastoralists are reported not to "count" their livestock when checking their presence in the herd. Lienhardt (1961:22) states that the Dinka dislike "either stating in figures how many cattle there are [in one's herd], or counting them by numbers and not by name of particular beast... cattle,... are not merely so many individual 'head of cattle',... [they] should not be treated as just so many equivalent unit in a herd". The Dinka think that the cattle have their own individualities, and that they are not anonymous or substitutable of one another. This attitude is indubitably incompatible with checking the herd members' presence by counting the numbers.

For the Karimojong, who live next to the Turkana, Dyson-Hudson (1966:98) states that "cattle are not enumerated, they are catalogued by name: an owner,... knows beasts are missing not by counting his herd, but by scanning and as it were leafing over the catalogue in his mind".

Gulliver states that the Turkana do not count their herd members. He (1951:21) says, "I have often watched people in the evening checking up on the return of the stock to the homesteads, not by counting heads, but by making sure that each one is there and there are no strangers". Animals are not counted by numbers, but each is checked one by one. Wienpahl (1985) also states that the Turkana do not count animals by numbers.

When the herd size is small, it may be easy to check whether each of them is present or not. However, the larger the herd size, the more difficult it is to confirm each one's presence.

A Turkana family with whom I stayed had about 200 goats, which are herded together by three herders during Aug. 1980 - Jan. 1981. The herders

assembled the whole herd together three times a day (at the watering place, resting place, and near their homestead shortly before returning home), and they checked the presence of all members of the herd, each of the herder taking his share of the responsibility. Below I will describe how they did it.

3-2. Confirmation of the presence of the members managed together in day-trip herding

Age-sex composition of the studied herd of 195 goats, and its allocation to three herders are shown in Table 8. The goats of this herd were managed together in the day-trip herding. Approximate age of the herders and the number of allotted goats were: Herder A (16 years old), 68 goats; B (19 years old), 91; C (13 years old), 36. The allocation of the whole herd into three was based on the developmental stage of individuals, for both males and females.

All the 13 males allocated to Herder A, were either reproducing or castrated males. None of the matured non-castrated males, (i.e., males which were still young and not selected as reproducing males yet) or young immature males, were under his charge. Among the 55 females under his charge, only five were nulliparous. In short, Herder A took charge of the individuals in stage III in Fig. 1, which were the eldest ones.

In contrast, Herder C was in charge of the youngest goats. All male goats under his charge were young immature males, and most of the females were also immature. All the six matured females of his were nulliparous. The herd included a total of 31 immature individuals, of which 30 were under his charge.

Herder B was responsible for the goats of intermediate developmental stage between those of Herders A and C. His goats mainly consisted of young matured males and matured nulliparous females, although goats of all categories except for young immature males were included. Further, castrated males and parous females under his charge were younger than those under Herder A's charge.

Each herder subdivides the goats under his responsibility into several smaller units, each of which has fixed members. The herders firmly bear in

mind both all the members and the total number of heads of each unit. Let us call these units "checking units".

When required to check the herd, the herder takes up his checking units one by one. The size of each unit is small enough for the herder to recall all of its members in his mind, and the total number of the members is also borne in his mind before he begins to check. Taking up one of these units, the herder confirms that each member is present in the assembled herd, and at the same time, he counts the number by folding his fingers. All the unit members are confirmed to be present by getting the right figure. Then, he checks the next checking unit. He must also bear in his mind which units he has already checked.

This method resembles the use of roll books. Each individual goat is, as it were, registered somewhere in the roll books, i.e., in the checking units composed of a small number of members. Figuratively, one herder has several roll books of his own, and he checks them one by one.

This method, however, differs from the use of roll books in several points. First, the members of each checking unit are not arranged in an alphanumerical order as they are in roll books. The herder checks the members of the unit in rotation as met in his eyes. Secondly, while the total number of the components does not have any function in roll books, in the Turkana's method it is only by arriving at the right total number that the checking is finally assured without omission.

This method differs also from the "counting" of individuals. The unit is not treated as a mere assembly of anonymous individuals. An individual animal is not counted as one of the heads. Herders confirm each animal's presence.

Table 9 shows the unit formation of the studied herd. The data were acquired as follows: First, I individually identified all the members of the herd, and asked each herder of his units, the total number and constituents of each unit. They could answer to my question without facing to the herd. Then, I asked the herders how they grouped the individuals into units, i.e., what kind of goat attributes they paid attention when forming each unit.

The unit size varied from 2 to 19 (mean, 7.5, N=26). If the unit size should be too small, it would be difficult to judge which units have been already checked, because the number of units increases. If the unit size

should be too large, it would also be difficult to recall all the constituents of the unit without omission, or to judge which individuals have already been confirmed to be present. If the same animal should be counted twice, this method would be useless, because the final confirmation by this method lies in getting the total number. The unit sizes in Table 9 can be regarded as sorts of optima.

The herders could tell me the total number of each unit in figures. However, they did not know how many animals they are responsible in total. Of course, they can calculate the total number, but they took no notice of it. It seems to me that the herders are not interested in the total number of animals. For the herders, the figures seem to be meaningful only for the confirmation of each unit members, and not for the recognition of the total number of the herd.

I came across with similar examples as above. A herder of 56 cattle herd bore in his mind that his herd consisted of one reproducing male, 20 castrated males, 13 parous females, and 22 nulliparous females, but he did not know the total number. Another man, herder of a mixed cattle herd of four families, gave figures as follows: owner A - 2 males and 5 females; B - 12 males and 13 females; C - 13 males and 40 females; D - 1 female. He, however, also did not know the total number of the herd of which he was taking care. The confirmation method of the herd members might be related to the herd size. The method for a herd of ten animals may differ from the method described above. Dividing into small checking units is unnecessary when the herd size is small.

3-3. Formation of the checking units in terms of the livestock classification in a specific situation

The checking units are not formed at random. From many attributes of livestock, the herders select specific ones, and put the animals which share the same attribute into one checking unit. Therefore, the formation of the checking units can be regarded as a kind of livestock classification under such a specific situation as the confirmation of individuals' presence. What kinds of animal attributes the Turkana pay attention to is expressed in their unit formation.

The basis for the division of the herd cited above into three is the developmental stage of animals. Turkana regard this attribute as the most fundamental. The herders told me that the head of their family allocated the herd to them.

I asked the herders what kind of animal attributes they adopted when they formed each of the checking units. Table 10 shows the results.

Herder C's unit formation was simple. He paid attention to the developmental stages and sex differences. The youngest ones were grouped into one unit (C3) without distinction of sexes. Goats of C1 and C2 were almost of the same developmental stage and older than those of C3. C1 and C2 were divided by the sex. C1 included both sexually matured and immature females. This shows that C1's members were not born at the same time. However, such a difference in developmental stage is ignored. What is important for unit formation is the relative position in the developmental sequence.

Seemingly, the developmental stage is prior to the sex in Herder C's unit formation. Possibly he divided his goats first into two (C1+C2 and C3) by the developmental stage, and then he divided C1 and C2 by the sex. However, if there had been more goats of the same developmental stage as that of C3 goats, which actually consisted of only eight animals, C3 might have been divided into two units by the sex. In such a case, it is impossible to judge from the herder's unit formation, which animal attribute is given the priority.

None of the Herder A's units included goats of both sexes. He separated them. Males were divided into two units - reproducing males and castrated males. Females are divided on the basis of their owners.

"Owners" of livestock should be defined before proceeding to the following descriptions. Among the Turkana, the livestock of one family are allocated to each of adult women who have their own huts in the homestead (wives and mother of the family head, his sisters who have given birth without formal marriage, etc.), although all the livestock belong to the family head formally (Gulliver 1955). For each animal when it is still alive, it is already determined in advance that from whose hut its meat should be shared. Women's "ownership" becomes clear in this way when sharing meat of livestock. Livestock allocated to each woman are divided further among her children, each of them having his/her own right to milk specific

animals. Usually they gather a part of their milk in their mother's hut for processing. The "owners" of livestock, meant in the following descriptions, are the women in this sense.

The head of the family, to whom the goat herd we now examine belonged, had four wives: two whom he himself married (1st and 2nd wife) and two from levirate marriage - one (3rd wife) from his elder full brother and the other (4th wife) from his younger full brother. The eldest son of the 3rd wife married leviratically the wife of the deceased younger brother of the family head (former co-wife of the 4th wife), and he stayed in the satellite cattle camp with his wife and children.

Herder A told me that females of unit-A3 in Table 11 were lumped together because all of them were lactating. A6 and A9 also included one lactating female each. A3 was exclusively composed of the lactating females which were picked up only from the goats of the 1st wife. A5 was an assembly of newcomers and all of them belonged to the 1st wife. Her goats were divided into three units because they were too many to bring together into one unit. Herder A primarily used ownership for forming his checking units, other criteria complementarily.

Herder A explained that A7 consisted of females of the 4th wife. It actually included those of the 3rd wife also. Their livestock were put together in one unit because Herder A, son of the 4th wife, had been adopted by the 3rd wife. Livestock of the two women were clearly distinguished. He, however, seemed to have certain rights over the animals of both women.

A9 was composed of goats of other family (A9) which were placed in this family's custody.

Herder B's unit formation was complex. The males were divided into three units and he explained me the bases of division as follows: B1 - non-castrated males; B2 - big castrated males; B3 - small castrated males. B1 included one reproducing male. Although this male was still small, it was distinct from the other males in this unit in that it had already been selected as such while the others were to be castrated in future. Further, B2, which was explained as an assembly of castrated males, included one reproducing male and one non-castrated male. They were not consistent with the label given by the herder.

I suppose that Herder B based his grouping of males on the

developmental stage of individuals. I estimated the age of each animal in the studied herd by the dentition¹² (Ohta 1982). Among the 12 males of B1, 10 were 3 years old, and 2 were older than 3 years at the time of study. All males in both B2 and B3 were older than 3 years, and they could not be discriminated by dental examination. The males in B2 were, however, apparently larger in the body size than those in B3. The relation of these units in the developmental stage was most likely B2>B3>B1.

He divided his males by relative age. Probably because the division nearly agreed with the distinction between the castrated and the non-castrated, he put such labels to his units as was explained to me. In this regard, Herder B's way of dividing males differed from that of Herder A, who strictly used castration as the criterion.

For the unit formation of females, Herder B used several criteria. B4 was labeled as the goats of the 4th wife. This unit, however, included three goats of the 3rd wife and three of the 4th wife. Further the 4th wife had two other goats included in B5, which was explained to be a unit based on the developmental stage. None of the other units had the label of the owner. The criterion of the owner was not applied thoroughly in his case, which sharply contrasted with Herder A's unit formation.

Units of B5 - B10 were formed on the basis of developmental stage, with the complimentary application of the differences in coat color. Herder B explained the distinction of developmental stages among these units as: B5>B6=B7>B8>B9=B10. Dental examination showed that all the females of B5, B6, and B7 were older than 3 years, that B8 included 3 goats of 3 years old and 2 of older than 3 years, and that all the goats of B9 and B10 were 3 years old. This result agrees with what the herder said.

The basis to discriminate B6 from B7, and B9 from B10 was the coat color. Goats of B6 were nangorok [spotted with black on white ground, see Fig. 3, A2] -pus [bluish], and goats of other colors in this developmental stage were gathered in B7 regardless of the colors. Goats of B9 are nangorok, and those of B10 were nakomoli [spotted with red on white], according to the herder.

Units of B11 - B14 were, by contrast, formed by the color, while the developmental stage was used complementarily. The colors were as follows: B11 - naaryangan [red], B12 - nakori [dotted with red on white], B13 and B14 - nakiryoona [black]. The herder explained that the goats of B13 were

older than those of B14. Dental examination showed that B13 included 1 goat of 3 years old and 5 of older than 4, and that B14 included 5 goats of 3 years old and 3 of older than 4.

The reason why the fundamental basis of unit formation was reversed from the developmental stage in B5 - B10 to the color in B11 - B14 is not clear. I asked the herder, but he did not give any satisfactory explanation. The colors adopted as the fundamental basis for unit formation were red, black, and dotted with red on white. It seems that the categories of "black" or "red" can be chosen more easily than other complicated colors, because animals which have white spots on black or red ground can be labeled simply as "black" or "red". However, there seems to be no reason to give priority to the last color, "dotted with red on white", over other colors.

The bases for Herder B's unit formation were the sex, developmental stage, color, and owner. Among his goats, there were nine lactating females (1st wife: 3 goats; 4th wife: 2; wife of family head's son: 1; other family: 3). He, however, did not lumped them together in one unit.

It must be taken into consideration that the unit formation changes with the population dynamics of animals. The females of one of Herder A's units, A3 (lactating females), began to lactate about two months before the study period, and this unit was non-existent before that time. The number of original members in a unit decreases as time passes, because of deaths, slaughters, or transfers. Other animals move in by gifts or exchanges. Reorganization is inevitable. Some units will be combined with others, and new units will be formed. The example above presented show a cross section of the unit formation in transition.

The size and composition of the livestock herd also affects which animal attributes should be chosen as the bases for unit formation. When a herder tries to form an unit on the basis of a certain attribute, the formation will be impossible if there are not enough animals of the selected attribute. Suppose an extreme case in which the family has only ten goats. The basis for unit formation might be "goat", if the unit should be formed at all.

Seven features are extracted from the examples, - the developmental stage, sex, castration, lactation, owner, color, and newcomers. Actual use of these features in the unit formation by each herder is shown in Fig. 9.

The developmental stage was the basis for the allocation of the whole herd to the three herders. Herders B and C used this label for their unit formation. This criterion is useful because it is applicable on variable scales, extended or reduced.

The developmental stage is also employed when the Turkana divide their family herd into several herding units. At the time of study, all goats of that family, except for 25 newborns, were managed together in one herd in the day-trip herding. The Turkana, however, sometimes divide the family herd of one species into two herding units, i.e., adult herd of reproducing and castrated males and parous females, and young herd of reproducing and non-castrated males and nulliparous females, when the number of animals of one species is too large (Ohta 1980).

Among Turkana's goats, there is a clear tendency to synchronization in the female impregnation and parturition.¹³ This may be due to the synchronic change in their nutritional condition according to the seasonal change in the vegetation (Dahl & Hjort 1976). Animals born concurrently are called as ajore [those of the same age] -apei [one, or the same] and the Turkana are fully aware of animal's relative ages.

Animals born concurrently are managed collectively from the primary stage. They are always handled together to keep them in separation from their mothers. Males and females are not discriminated in stage I in Fig. 1, and the classificatory term for them has a neuter prefix. In terms of life history of livestock, developmental stage is the first attribute employed when people treat livestock as a group. It is related to this way of management that both Herders B and C, who were in charge of younger individuals, used developmental stage for their unit formation.

The principles for selecting basis for unit formation did not differ much between Herders B and C. The essential difference lay in that the sex was prior to the developmental stages in Herder B's unit formation, while for Herder C, the priority was reversed. Herder A, who was responsible for the animals in the most advanced stage, used different attributes as the bases for unit formation. For females, Herder A applied the distinction of owners thoroughly, while Herder B used it only for one unit. Also for males, while Herder A divided them by the distinction between reproducing and castrated males, Herder B distinguished them by the developmental stage. How can this gap be interpreted?

Let us restrict the argument to the difference between the two animal attributes, i.e., the developmental stage and the owners. It is reasonable that the herders pay attention to the individual developmental stage, because individuals born concurrently are treated as a group at the time of milking when they are newborns. The distinction of the developmental stages of Herder B's goats must have been established when these goats were newborns. He still retains and adopt this way of forming checking units.

Table 11 shows the distribution of goats to each owner.¹⁴ Apparently even among Herder B's goats, the females of each owner were many enough to make units by the distinction in owners, which Herder B did not do. He still depended on the developmental stages, which he acquired when his goats were treated in groups in relation to their mothers.

Why did the basis for unit formation change from the developmental stage to the owner in Herder A's unit formation? One possible interpretation of the difference is that Herder A could not form units by developmental stage because the number of animals in the same developmental stage was too small among his goats. It was possible for him, however, to use this attribute on an extended scale. He could have collected animals in the adjacent developmental stages into one unit.

The Turkana's attention to the developmental stages may decrease as animals grow older. Matured nulliparous females are still ascending their stages, and the stage is significant for the Turkana. After the first parturition, on the other hand, they reach the highest stage of development, and further discrimination may be unnecessary from the Turkana's view.

I think that the Turkana's intense consciousness of livestock ownership was reflected in Herder A's unit formation. They clearly recognize the ownership not only of the livestock in the most advanced stage, but also of all the remaining livestock. Parous females are, however, more important than nulliparous females because of their proved fecundity, and they are not given to or exchanged with others as are nulliparous females. The tie between a female animal and its owner is strengthened progressively in the Turkana's recognition, through the repeated milking by the owner.

Lastly in this chapter, I want to mention that the genealogical relationship among the livestock is not employed as the distinctive

features for the unit formation. Umesao (1969) stated that the Datoga in Tanzania could tell the loss of even a single cattle without counting the head or checking records. He suggests that it is made possible because they are aware of the sub-groups composed of matrilineally related individuals in the whole herd. The Datoga give the same proper name to all individuals in one matrilineal group, therefore the names can be regarded to be those of the matrilineal groups. These groups function to divide the whole group into several units (Umesao 1969).

The Turkana recognize genealogical relationship of livestock well, although they neither have such kind of livestock names as among the Datoga, nor utilize the genealogical groups as the basis for unit formation.

Table 12 shows the matrilineally related groups ("family") in the studied herd. This result was obtained by interview with the Turkana. In some cases, they asserted that certain two goats have a common ancestor, although they could not recall the genealogical lines strictly and there occurred disagreements among the informants. I set the boundary of a family as follows: goats A and B were regarded to belong to different families when they were informed to be related via more than two goats which were not present at the study period. The boundary of obtained families agreed well with the Turkana's actual recognition of blood relationships.

In the herd of 195 goats, there were 61 families including those which had only one member. The family size varied from 1 to 16. The number of generations in one family ranged from one (families composed only of sibling) to four. The Turkana's recognition of the genealogical relationships of goats is no poorer than that of the Gabra in northern Kenya, who have a similar livestock naming system as that of the the Datoga (Imai 1982).

Why do the Turkana not treat goats of one family in a group, although they recognize well of their relationships? One of the possible reason seems to be the size of the livestock families, i.e., their size is inadequate for the unit formation for checking. Another explanation is that the members of one family cannot be handled in a group because they are separated when the Turkana make up herding units for adults and young animals respectively. However, the Datoga and Gabra also separate the

offspring from their mothers in order to prevent them from suckling. At present, this question cannot be answered without further research.

4. Livestock individual names

4-1. The custom of naming livestock among East African pastoralists

The custom of naming livestock is reported from many peoples in East Africa. For example, Dyson-Hudson (1966:96) states that "every cow, ox, calf has at least one individual name, commonly several" among the Karimojong in northeastern Uganda. Other ethnographers report briefly that livestock are given names and animals recognize their names (Keyo: Massim 1927/1968, Kipsigis: Peristiany 1939, Iteso: Lawrance 1957, Marakwet: Kipkorir 1973, Sebei: Goldschmidt 1976).

Livestock naming has been discussed by anthropologists in relation to such a custom that each adult man name himself ("ox-name" or "cattle-name") employing the vocabulary which refer to his favorite oxen (e.g. Evans-Pritchard 1934 & 1956, Gulliver 1952, Lienhardt 1961, Almagor 1972, Gourlay 1972, Fukui 1979). The theme of this discussion has been focused on the social and religious meanings of the peculiar relationships between men and cattle.

However, it has not been fully examined what kind of terms people employ in naming livestock, and what the function of such naming is. Furthermore, it has escaped the careful examination whether the livestock names can be regarded as real proper names or they are mere descriptive terms. It is impossible to distinguish proper names strictly from terms for descriptive reference in the end. But it must be examined what kind of terms people use in naming or in referring to animals, and how they use these terms according to various situations.

Some anthropologists state that only parous females have proper names (Maasai: Jacobs 1965), and that the mother's name is succeeded by its offspring (Maasai: Merker 1910, Baggara: Reid 1930, Iraqw: Huntingford 1953). Seligman and Seligman (1932), who commenced the study of

"identification" between man and cattle in East Africa, clearly stated that "the names of oxen are not individual names (as the names of cows are) but names which they share all other bulls and oxen of the same class" (p. 169), and that " ... cows (not heifers) are given personal name which they bear through life" (p. 170). Only a few anthropologists studied livestock proper names: Umesao (1969) on the Datoga and Imai (1982) on the Gabra. Livestock names are succeeded along the matrilineal lines in both of these tribes.

On the Turkana, Gulliver (1951:17) states, "each ox has an individual name after some outstanding feature of horns, color, or hump". Wienpahl (1984, 1985) states that the Turkana give names only to adult females of cattle and camels, and that female goats and sheep do not have distinct personal names, although they are called by the terms of coat color at the time of milking.

When the livestock is concerned, it is not common for the Turkana to say "to give proper name (alimokin ekiro)", nor to say "what is its name? (ngai ekiro keng?)". Usually when the Turkana designate specific individuals, they descriptively refer to the color, shape of horns and ear-cut, the owner, etc. Descriptive referring to the livestock clearly differs from the use of individuals names.

They, however, explained that parous (and milked) females of livestock are given individual names. These females are called with this type of names at the time of milking. In the case of donkeys which are not milked, their individual names are also called when they are used for packing. Both male and female donkeys are named. I define these names as livestock individual names.

I collected individual names of 350 animals (190 goats, 58 cattle, 70 camels, and 32 donkeys), and studied the meanings of the names and the reasons for naming¹⁵.

First, I will examine what kind of animal attributes the Turkana pay attention to when naming livestock. Livestock are named after some of their own attributes. I have described the livestock classification system of the Turkana in Chapter 2. The vocabularies in the classification system are used at the time of referring to individuals, and a part of them offers the basis of livestock names. In the selection of vocabularies, the direction of the Turkana's interest toward the livestock is expressed.

Some animal attributes which are not employed in the classification system are also used in their names.

Second, I will examine how individual names are actually used. The names are called at animals, and are also employed for referring to them. However, the animals are also referred to by descriptive terms which are different from individual names. I will examine the distinction between the two ways of referring to animals, by individual names and by descriptive terms.

4-2. Vocabularies employed in livestock names

4-2-1. Materials and the linguistic treatment of elements in livestock names

The subjects studied were two goat herds, two cattle herds, three camel herds, and two donkey herds. Each herd constituted a unit for day-trip herding. I made individual cards to identify all the animals and to check their names. Table 13 shows the number of individual names and their overlap in each of the herds. It is clearly shown that only a few have the same names.

I treat the linguistic composition of the livestock names as follows. I tried to find out all the elements included in each name and the original form of each element. It is, however, difficult to analyze all the elements linguistically including prefix, suffix, other grammatical markers, etc. For example, a name, napudakuui consists of three elements: na (feminine prefix) + -puda (from akipudare = to step on) + kuui (from ngakuui = branches). This name implies that the named animal used to step on the branches of trees, which people cut to feed it because it was not healthy and unable to go out for grazing when it was young. In the following analysis, this name is treated as consisting of only two "elements", -puda and kuui, discarding the gender prefix. Names given after proper nouns (names of place, person, etc.) are treated as consisting of only one element even if the proper nouns can be analyzed semantically.

I briefly examine the gender prefix of livestock names here. Livestock names are not always accompanied by the feminine prefix, but by the masculine or neuter prefix, although all named animals treated here are

females. Some names are accompanied by the gender prefix of plural form. They are excluded from the analysis of gender prefixes, because the plural masculine and neuter prefixes are indistinguishable, taking the same form (ngi-). A few names do not have gender prefix at all.

The distribution of gender prefixes is shown in Table 14. Some names have masculine or neuter prefixes, although names with the feminine prefix form the majority. This shows that the livestock names described in this paper are true proper names, because the terms for descriptive referring are always accompanied by a feminine prefix for adult female animals.

There is not any significant difference in the frequencies of three gender prefixes among livestock species. The prefix does not differ significantly between the large (cattle and camels) and small (goats) livestock ($\chi^2=0.94$, $df=2$, $p>0.2$).

Also for the humans, gender prefixes of proper names are not always coincident with the sex of name bearers. It is difficult to compare the livestock names directly with those of humans, because the Turkana have two types of human names: the name succeeded from others, and the name given after certain attributes of the person so called (such as the situation of birth). But among the family members, the name of daily use converges to only one. Therefore, I selected the names of people whose daily names I knew well for the comparison (Table 15). The disagreement of the gender prefix of human names with the sex of name bearers shows that it is not uncommon for the Turkana to call the subject by a proper name whose prefix does not agree with the sex of the called.

4-2-2. Etymology of livestock names and terms used in names

Before we discuss the origin and meaning of the livestock names, following points should be noted. All names are given after the attributes of the subject animals. However, the reason for giving a specific name to a certain individual cannot be made clear in the name itself. The same name can be given to animals for various reasons. For example, an animal whose name is derived from the term of a plant species, could be so named either because it was born under a tree of that species, or because its coat color resembles the color of the fruits of the plant. Its name might have no relation to the plant itself, but have been derived from a man's name who was named after the plant. Further, the animal might have been

named after the man because he was its former owner, or because its coat color resembled that of the man's favorite ox. It is impossible to detect the backgrounds of livestock names from the names themselves.

The origins of the individual names are shown in Table 16. Roughly, livestock names imply conspicuous appearance or specific experiences of the name bearers. I classified them into six types: (1) external appearance, (2) place and situation of birth, (3) transfer, (4) behavior, (5) accident, and (6) relationship with other animals. Only three individuals are named after two of the above attributes: the appearance and behavior in one goat and one cattle, and the appearance and accident in one goat. These names are classified as names after the behavior and the accident respectively.

For the description of vocabularies for the livestock individual names, "CP terms" and "non-CP terms" are distinguished. CP terms include "color" terms and "pattern" terms, which I described in Section 2-2. The Turkana have nine color terms and 16 pattern terms, which constitute 25 CP terms in total. The other terms used for livestock naming are non-CP terms.

(1) Names after the appearance (277 animals)

The majority of individuals (79.1%, 277/350) have names of this type. This type is especially common among goats and cattle. Terms included in the names are shown in Table 17. The animal appearance is divided into two: "color" and "shape". The latter includes all the physical characteristics of animals except for the coat color.

Most names which refer to the external appearance are composed by paying attention to their color (222 individuals, 82.2%, see, Table 18), partly because the Turkana use the CP terms with high frequency in livestock names. However, even if we exclude all the names which are composed exclusively of CP terms, names of 107 individuals (39.6%) are refer to their color. Further, if we exclude all the names which include CP terms, the remaining 72 individuals (26.7%) still have names referring to their color by various common nouns. Only 35 individuals (12.6%) have names which refer exclusively to their body shape. There are only 20 animals with the name referring to both the color and the shape. Their colors are always referred to by CP terms.

Composition of names and respective number of animals are as follows:

(1) names of only one CP term (34: 12.3%), (2) names of two CP terms (81: 29.2%), (3) names of one CP term and one non-CP term (55: 19.9%), (4) names of only one non-CP term (87: 31.4%), and (5) names of two non-CP terms (20: 7.2%).

1A. Names consisting exclusively of CP terms (115 individuals)

Names of this type consist of either one or two CP terms. They refer to the coat color of the bearers, and amount to 41.5% (115/277) of the names referring to the appearance of the subjects.

1B. Names containing common nouns to indicate animals other than the subjects (44 individuals)

Most of them imply the bearers' resemblance to other animal species in the coat color (42 individuals), and the rest in the shape (2 individuals). Various animal names are employed in this type of naming (Table 18). They include mammals, birds, insects, and millipede. If more samples are collected, other animal species may be added to the list.

Majority of these names (38 individuals: 86.4%) are composed only by adding (or changing) gender prefix to the original terms (common nouns indicating certain animal species). The original terms also have their gender prefixes. When their prefixes are masculine, the prefixes are changed into feminine in some cases. When the original term for an animal species is combined with the CP term (3 individuals), the order of terms is: [CP term] + [term for animal species], both of them referring to the same attribute (i.e., the color) of the named subject. The remaining three individuals have names of the combination of a non-CP term and a term for animal species. All these non-CP terms are "body terms" (see, 2-2.), and they are ordered: [body term] + [term for animal species] (e.g. for a goat which has an ox-like head, akoumong: akou [head] + emong [ox]).

1C. Names containing common nouns of plants (2 individuals)

Both of the collected examples imply the color resemblance to the plants, engomo [Grewia tenax] and arikot [general term for small plants grown in moist place, such as moss, etc.]. The number of plant species used in the livestock naming may increase if more data are collected.

1D. Names containing terms for horn shape (10 individuals)

Four of them include only the term for horn shapes. The term for horn shapes is combined with a CP term in the remaining six names. These names

refer to two distinct attributes of the subject, i.e., the color and the horn shape. The order of terms is: [CP term] + [term for horn shape].

1E. Names containing terms for ear marking (11 individuals)

Five of them include only the term of ear markings. Two names are combinations of a CP term and a term of ear markings in the order of [term of ear markings] + [CP term]. The remaining four animals has the same name, composed of two non-CP terms (apeiakit: apei [one] + akit [ear], one ear is cut off and the other ear is left intact) [For 1B, 1C, 1D, and 1E, see Appendix 1].

1F. Names containing terms designating a part of body (34 individuals)

These names contain "body terms" (see, 2-2), which refer to the specific body parts where a conspicuous color characteristic appears. Twenty of them are combinations of a body term and a CP term with the order of [CP term] + [body term] (e.g., amerikou: ameri [dotted] + akou [head]). Names of other three individuals are composed only of a body term (e.g., namoiyo: na- [feminine gender prefix] + ngimoiyo [fingers]; an animal with long nails). The remaining eleven individuals are named by the combination of a body term and a non-CP term (e.g., aitaruk: a- [feminine gender prefix] + -ita [pointed] + aruk [hump]).

Body terms used for the livestock individual names are: akou [head], akituk [mouth], akooki [belly], amategen [cheek], etid [spleen, this refers to side of belly], akit [ear], etole [front part of the neck], arari [a part of the neck], aboi [stomach], apoli [side of the belly], ewosin [buttock], akau [back], aaket [breast], aruk [hump], ngimoiyo [toes], epenek [beard], akolikoli [side of the breast], ngakwas [front legs], atorob [breast], ekosim [tail], ngamuroi [hind legs] [Details of 1F are shown in Appendix 2].

1G. Names referring to animal colors by the terms not described above (42 individuals)

These names are due to the color resemblance between the fur of the named animal and certain objects from which the names are derived. The original objects (and its colors) used in the naming are: beads (blue), a part of meat (red), empty tin (dotted), mole (spotted), a kind of milk product (black), a kind of oil (brown), shadow (black), a kind of girls' apron (dotted), girls' make-up with red ocher (red), a kind of men's ornament (white gaiter-like spot on the leg), bullet cartridge (yellow),

etc. (see, Appendix 3). A human personal name is also utilized in a name of this type, referring to the color resemblance of the named subject to the man's favorite ox. The term for a alternation set, ngimoru¹⁶, is employed to refer to black coat color of an animal. Such terms as "to glitter", "to tear off", "road junction", etc. refer to the shape of white patches on the animal bodies. Most names of this type are composed of only one non-CP term (29 individuals). Among the remaining names, non-CP terms are accompanied either by a CP term (12 individuals), or by a non-CP term (1 individual). Even in the case of the name which contains two elements, the attribute of the animal mentioned by the name is only one (e.g., for an animal with coat color of blue beads, napuskoloumwai: na [feminine gender prefix] + -pus [blue] + ngakoloumwai [beads]).

1H. Names referring to the animal "shape" by terms not described above
(9 individuals)

Some names of this type directly refer to the external characters of the subject: dwarf, tall, round-shouldered, hairy, etc. Others refer to the animal attributes figuratively by other objects: long spear, gentle hill, etc.

1I. Names referring to both the color and the shape of the subject (12 individual)

All names of this type refer to two attributes of the subjects. They are combinations of a CP term and a non-CP term, the former referring to the color and the latter to the shape. Non-CP terms utilized are: eewoi [tall], eureny [dwarf], achekes [hairy], and etebus [swollen (stomach)] [For the details of 1G, 1H, and 1I, see Appendix 3].

(2) Names after the place or situation of birth (22 individuals)

All names of this type refer to only one attribute of the named animals. Terms which indicate the place of birth (and the number of animals with such names) are: common nouns of such geographical features as river, depression, etc. (3), place names (12), a tree name (1), [village, or area where a man usually live] (1), [a man's] homestead (1), [camels' enclosure] (1), [yellow hide] (1). Only one animal is given a name after the situation at the time of birth, named "running away". It was born when the people were in the confusion of running away from the attack by a neighboring tribe.

There is no apparent difference between the terms for camel names and those for donkey names. It does not matter much whether the subject is a camel or a donkey at the time of naming. No individual of goat or cattle has a name of this type, although the Turkana do not have any rule for it. Naming after the birth place is also practiced among humans [For the details of (2), and the following (3), and (4), see, Appendix 4].

(3) Names after the transfer (20 individuals)

Names of this type can be divided into two sub-types: the names derived from the former owner (18 individuals), and the names from the way of transfer (2 individuals). All names of this type mention only one attribute of the subject by one or two terms.

Terms for referring to the former owner (and the number of animals with such names) are: personal names (11), clan names (3), name of a local group (1), "my grandfather" [kinship term viewed from the present milker] (1), "poor man" (figurative reference) (1), "son of ngiworya [an age-set name]" (1).

The way of transfer is referred to by the goods given in exchange, "alcohol" and "a castrated goat".

No cattle has this type of name, although there is no prohibition. The terms employed for naming do not differ among other three livestock species. The difference in livestock species is not taken into consideration at the time of naming.

(4) Names after conspicuous behavior (13 individuals)

Terms employed for names of this type (and the number of animals with such names) are: "roll around" (1), terms for bleating (3), "suckle after growing up" (1), "foolish" (3), "rope" [the named animal must be tied up for milking] (1), term for a device to prevent an animal from struggling at the time of milking (2), "to step upon branches" (1), "to refuse carrying basket" (1).

Two of them contain one CP term, and they mention two attributes of the bearer, i.e., the behavior and the color. In this case the order of terms is: [non-CP term] + [CP term]. All the other names mention only the conspicuous behavior of the bearer.

(5) Names after the accident met by the bearer (16 individuals)

A name of this type refers to a unique accident. The terms adopted and reasons for the naming are as follows:

(a) "akwara [spear]": it was arranged to be speared, but the plan was abandoned.

(b) "echopot [eye-ball]": its eye-balls are projected because of a past disease.

(c) "[a boy's proper name]": it was milked by him formerly.

(d) "lokapa [kinship term for a half brother]": the reason is unknown.

(e) "lomezekin [name of a human disease]": one of the family members was suffered from this disease, and this animal was arranged to be presented to the prophet (emuron) who offered an advice, but the plan was abandoned.

(f) "nadungot from adungot [scar]": it was injured by mistake when a herder beat it with sticks.

(g) "lobanyet from ebanyet [razor]": it was born prematurely. A razor is ritually used to give vigor to such newborns.

(h) "longoleuryan: angole [baldness] + akiuryan [to sit down]": a part of its belly is bald, because it used to lie down when it was sick.

(i) "lotodoreng: lotodo [one-horned] + aaryangan [red]: "one-horned" signifies figuratively that one of its udder is useless because of a disease in the past. This name refers to its coat color at the same time.

(j) "namunimunyo [term of ear cut]": its ears were cut off for treating a disease.

(k) "nakais from akai [hut for sleeping]": it used to lie down in the hut when it was young because of sickness.

(l) "nabilil from abila [fracture]": it suffered a fracture.

(m) "losikirya from asikirya [donkey]": because its mother died when it was still too small to graze, people brought it up with an donkey's milk.

(n) "nakokiyo from ekoki [orphan]": it was orphaned.

(o) "nabosoki: ebos [smell bad] + ngaki [ears]": its ears smelled bad when it became sick.

(p) "nakonyata from akikony [to bite]": it was bitten by hyenas in the buttock.

All these names except for (i), refer only to one attribute of the

subject.

Note that most of these names refer to such misfortunes as diseases or injury (9 cases), orphaned (2 cases), born prematurely (1 case), and doomed to be speared (1 case). Probably these misfortunes especially call the attention of the Turkana. In some African societies, humans are named after such negative matters as death, sorrow, and poverty, etc., and it is explained that the naming of this kind offers the way to cope with such misfortunes (e.g., Beattie 1957, Middleton 1961). The Turkana, however, do not name humans in this way. Livestock names given after misfortunes also differ from the similar human names, in that misfortunes are taken in advance for human names (their names are given without meeting the misfortune actually), while animals are named after the misfortunes which they have already met.

(6) Names after the relationship to other individuals (2 individuals)

Names of this type are not common among the Turkana. One name is "i [neuter prefix] + ka [of] + kori [pattern term]", meaning "offspring of akori". The other refers to offspring of the name bearer reversely. It is "ata [mother of] + ao [bee: coat color of its offspring resembles that of bees]", meaning "mother of ao".

4-2-3. Characteristics of the Turkana's livestock naming

Distribution of livestock names in each of the studied herds, viewed from the element composition and the origin of naming, is shown in Table 19.

The livestock naming by the Turkana is summed up by the following five points:

- (1) all names refer to certain attributes of the subject,
- (2) most names refer to only one attribute of the subject,
- (3) no name contains more than two elements,
- (4) no significant difference is found in the Turkana's attitude to each livestock species through the naming,
- (5) the Turkana do not give the same name to matrilineally related animals.

These points are given closer looks below. First, all names refer to certain attributes of the subject. Generally, the proper names could signify that the named subject belongs to a certain class. For example, a

cow named "blackboard" could be a member of the class of black cows. Livestock names among the Turkana, however, do not convey any such actual meaning as to classify the named subject into certain category. On the other hand, proper names do not necessarily agree with one of the attributes of the subject, because it is the subject itself but not the attribute of the subject which is referred to; the name simply playing the role of a linguistic label of the subject. Nevertheless, the livestock names are taken from the terms for referring to the attributes of the subject. Most livestock are named after their external appearances. This implies that these names are essentially related to the descriptive referring to the subject. Among goats and cattle, which have wide variety in their coat color, naming after the appearance is high. Even among camels and donkeys, whose coat color is rather uniform, more than half of their names refer to their appearances.

The second point is that most livestock names refer to a single attribute of the subject. Only 24 individuals (6.2%) have names referring to two attributes, and names of 23 of them contain CP terms referring to their coat color (Table 20).

The third point is that none of the livestock names contains more than two elements (excluding gender prefix, suffix, etc., see 4-2-1). 51.5% (179/350) have names composed of one element, and 48.9% (171/390) of two elements.

The fourth point is whether there is any difference in the naming between livestock species, which would suggest the difference in the Turkana's attitude to each livestock species. The notable differences are that all cattle are named after the attribute of appearance except one cow, and that names after the attributes other than the appearance, especially those derived from the place of birth, are common among camels and donkeys compared with goats and cattle. The names of 43.2% (82/190) of goats and 41.4% (24/58) of cattle are composed exclusively of CP terms. In contrast, there are only a few individuals whose names are composed exclusively of CP terms among camels (8.6%) and donkeys (9.4%). These differences, however, seem due to the fact that the coat color variation is small in both camels and donkeys, and that it is not easy to give them names referring to their coat color, because the same name with others in a herd should be avoided. For camels and donkeys, the animal attributes for naming should be searched

for from other fields than the color. Although the situations of birth constitute large portion of the origin of names among camels and donkeys, it does not mean that their birth attracts the Turkana's attention more than that of goats or cattle.

The last trait of the Turkana's livestock naming is that they do not give the same name to the mother and its offspring as some other pastoralists do. Umesao (1969) reported that mother and offspring of cattle are given the same name among the Datoga, and cattle respond to their names. Among the Gabra (Imai 1982), goats are given two names, i.e., the name of the matrilineal group and the individual name, and goats respond well to the former.

The Turkana do not give names to matrilineal groups, although their recognition of the genealogical relationships among livestock seems no less than that of the Gabra (Imai 1982). They do not give names to livestock other than parous females, except for donkeys.

Umesao (1969) states that the matrilineal groups, which the Datoga recognize families in the livestock herd, have corresponding structure on the human side. Each adult woman who has her own livestock in a extended family constitutes sub-unit of the family with her children. The Turkana, however, do not name the matrilineal groups of livestock, although they have the same sub-units within a family as the Datoga. It seems necessary to collect further data on the peoples' recognition of genealogical relationships among livestock and on the use of livestock names, to discuss the differences in livestock naming between the Datoga or Gabra and the Turkana.

4-2-4. How many livestock names are there?

Lastly, I want to discuss the size of the vocabulary for the livestock naming. There are only a few identical names in one herd (see, Table 13). Females except for donkeys are named by their milkers. The family herd is divided among adult women of the family (Gulliver 1955), and each female animal is allotted again to a specific member of the family. Each family member has the priority to the milk produced by the females assigned to him/her. The milkers are also fixed according to the milk right. Adult men do not milk and women and children milk their animals instead. The milkers give names to their own female livestock. For donkeys, their users,

usually the women who own them, name them.

There are only few identical names in one herd, despite of the fact that female animals of one herd are named by several members of the family. That is, family members take it into consideration at the time of naming; i.e. what kind of names are given not only to their own females but also to all the females in the family herd. All females milked by one person have different names from one another.

Even when the distinction in animal species and in the herds are ignored, there are 290 distinct names and 245 individuals (68.1%) have unique names among the total of 350 animals studied (Table 21). Only nine names are given to more than two animals.

Although it is actually impossible to choose names at random because the names should refer to certain attributes of the subject, let us assume that livestock names are given at random when the sample size is large enough. In Table 21, the observed distribution of number of names are compared, with the expected values of truncated Poisson distribution. The observed values are closely approximated by the expected values ($\chi^2=3.169$, $df=1$, $0.1 > p > 0.05$). Two factors, that the number of names given to two animals is small, and that those given to three animals is large reversely, caused the bias of the observed value from the expected. This may be due to the fact that some names are preferred and adopted in several herds independently, which I treated together in this analysis. However, it can be expected that the observed values will approximate the expected values closer, when more samples are collected.

The expected value for the term of zero is 648.17. This figure signifies the number of names which are not adopted in the samples, although they probably exist in the Turkana's pool of livestock names. In total, therefore, the pool contains about 1000 names, although this figure should be treated only as a rough estimate.

The pool of terms for the livestock naming, however, is probably not a closed one. There must be some flexibility for the name givers to create new names. Some names are newly invented and added to the pool little by little, and others drop out of the pool.

Expectedly, the larger the herd size, the more number of elements are used in each of the names, because people should give each individual a different name from others in the herd. Table 22 shows how many elements

are employed in the naming. Apparently our expectation is found incorrect: the number of elements in the name is not related to the herd size. For example, the proportion of names of two elements to the total number of Herd A is larger than that of Herd B, although Herd B is larger than A. This shows that the Turkana do not make constant effort to reduce the number of elements in livestock naming.

When they select terms for livestock names, they do not always choose the CP terms. The smallest goat herd, C, is highest in the proportion of names of one element among the goat herds. However, more than half of them are composed exclusively of non-CP terms. Primary terms are not always preferred to non-CP terms. This shows that the Turkana have a large pool of terms for livestock naming, and that they sometimes choose non-CP terms from the pool even when CP terms are usable. The high frequency of names of two elements among smaller herds can be similarly explained.

The above discussion also applies to the selection of animal attributes for the naming. Names after the appearance of the subject occupy a large part of livestock names of the Turkana. However, the Turkana can name animals after other attributes, even when they can name them after the appearances.

Livestock naming by the Turkana do not have such practical functions as to classify individuals. The size of the studied herds is far smaller than that of the pool of terms for naming. The name of an animal cannot be determined automatically, although it is possible to expect it statistically. A considerable freedom is given to the name givers.

4-3. Use of individual names and descriptive reference of livestock

Livestock individual names are used in two situations: to call the animals (the name bearer is the addressee), and to refer to the animals in the speeches in the human conversations (the name bearer is the referent). When people talk about their animals, the animals can be referred to either by their individual names, or by suitable descriptive terms. In the study individual names of livestock, the following three should be carefully discriminated: the suitable descriptive terms of the animals, the proper names to address to the animals, and the proper names to refer to the

animals in the speeches among humans.

4-3-1. When the animals are addressee

The Turkana give names to livestock originally to call specific animals. Livestock names are regarded as the means of communication between man and animals. To discuss the role of the livestock names, we must separate the following two aspects: how the people think of it, and to what extent the names are actually effective for the communication.

When asked, "do the animals respond to their names?" all the Turkana answer, "yes". When asked, "do they respond as dogs do?", they answer, "yes, but camels do not respond well as cattle, goats, or sheep do".

However, we must be careful when interpreting such answers. The Turkana's idea on the response of animals is more complex than it appears.

To my question, a woman answered: "Animals respond to their names, and lactating females that have lost the newborns respond especially well," and "I will show it to you when I milk my goat in the evening." What she showed me in that evening was not to call the female goat to her. She called the name of the goat first when she tried to seize it. It was not clear to me whether the goat responded or not. Then she began to milk it. She called its name again and again, and made a certain vocal sound which the Turkana always make when milking. The goat shook its head as it turned its face. Then she said, "Look! It knows its name." She explained: "Females of this kind answer to their names when they are milked; they feel as if they were suckled by their offspring".

What she implied by saying that the animals responded to their names, was in fact that the name calling had some effects on the animals so as to make them accept the milking. I have never seen any Turkana calling the livestock in the same manner as they called dogs, which respond well from far away.

I mentioned that there were only a few individuals with the same names in a livestock herd. The avoidance of name overlapping is due to such Turkana's idea that the name calling has certain effects on the animals, although the Turkana did not explain it explicitly.

Several authors state that the female livestock respond to their names. Umesao (1966) states that the mother and offspring of cattle, which are given the same name, remember their name well, and that they respond to

the calling. Goldschmidt (1976), Massim (1927/1968), and Reid (1930) state that cows approach to the man who calls their names. Imai (1982) states that goats approach to men when they are called.

In my observation among the Turkana, the response of animals to their names was not clear. The Turkana do call the names of females when milking them. The behavior of female animal, however, seems to be affected by many other factors. When calling a mother cow, the milker makes an explosive sound by the lips, breathing in, as the milker opens the entrance of the calves' enclosure to take out the calf of the cow. The milker seems to be indifferent to the location of the cow. Anyhow, most mothers stay near the enclosure where their offspring are kept. It is the explosive sound and the presence of offspring, but not the calling only, that influence the behavior of the mothers to approach to the enclosure, or to the milkers.

When goats or sheep are milked, some kids are taken out of the enclosure and carried in the milker's arms up to the mothers, while others are released and they run around in the flock looking for the mothers. In the former case, the milker call the name of the mother, walking toward it with the kid in the arms. The mother, however, does not show any clear responses. Females with offspring, especially those shortly after the parturition, tend to flock around the enclosure, bleating and looking for their offspring, and it is unnecessary to call them to the offspring, or to the milker.

According to Tani et al. (1980) and Tani (1982), trained castrated males of goats and sheep respond adequately to the verbal commands of the herder, and habituated female sheep approach to the man who call their names. It is widely practiced to train draft cattle to respond to such verbal commands as "stop", "forward", "turn to the right", etc. These facts show that these animals can respond to their names, when they are appropriately trained.

The Turkana, however, do not intentionally train animals. Among other African pastoralists whose animals are reported to respond to their names, there is no evidences of animal training, either. Therefore, the animals learn to respond to their names by themselves. They may learn to combine the utterance itself (not its meaning, i.e., their names) of humans with the situation to be milked. The females' names may function originally as a sign to appeal to the subjects that they are going to be milked. Through

the repeated process of milking, the animals may become to respond to their names in situations other than milking.

The response of animals to their names, however, is not clear even at the time of milking among the Turkana. The repeated calling of names at the time of milking is not enough for the animals to learn their names. Among the Turkana, the livestock name does not play a great role in the man-animal communication. Calling animals is only one element of various techniques to calm animals and to make them accept milking. For the comparative analysis of the differences in the animals' response to their names among pastoral peoples, further detailed data are needed.

The animals are called also in the day-trip herding. The herders hurl abuse at the animals which behave against their intention. They shout at the animals, and sometimes throw sticks or stones at them. The calling, only when combined with the herders' action, has some effects on the animals. The effects cannot be found without the total performance of the herders. This type of calling can be regarded as just an expression of the herder's anger or irritation. All the terms to specify the subjects in the calling of this kind, which I observed, were color and pattern terms to refer to the coat color of the subjects. These callings are different from the individual names by my definition.

4-3-2. When the animals are referent

When I was investigating the livestock names of parous females, I was sometimes answered, "I don't know its name. Ask the one who milk it." The individual names of parous females, especially of the young ones, are not known in some cases even among the same family members. Parous females are given names by their milkers, and the names come to be known by other members of the family through repeated calling at the time of milking.

Then the livestock names, originally the names of address, come to be used as the names of reference among persons within a limited extent. The conversion, however, does not proceed fast. Before being given names, the female animals are referred to by descriptive terms suitable for them. Even after they are given proper names, people continue to use these descriptive terms for referring to them. The same applies to the names of donkeys. It takes two to three parturitions for a goat or sheep female before the family members get accustomed to using its individual name. The

names of address and those of reference are the same among old female goats and sheep which have given birth to many offspring. For cattle and camel females, the conversion process needs fewer parturitions than those of goats and sheep, probably because their lactation period is longer and their milk is more important in the man's diet.

When referring descriptively to individual animals which are not named, the number of vocabularies employed for specifying each animal would increase, as the number of animals to be distinguished increases. In a family with a goat herd of about 300 head, with whom I stayed for a long period, people referred to two or three attributes to specify each of them.

The attribute which was most frequently used in the descriptive references was the coat color. Almost all the terms to refer to the color were CP terms, and the figurative reference to other objects based on the color resemblance was seldom used when descriptively referring to animals. The next attributes referred to were the ear marking and the horn shape.

Some terms, which are not adopted for giving livestock names, are used for descriptive reference to animals. They are classificatory terms based on the sex and developmental stages, and the names of owners or milkers. Other infrequent expressions are: "offspring of so-and-so animal", "brother (sister) of so-and-so animal", "transferred from so-and-so person", etc.

Several combinations of animal attributes can specify the individuals, because the members of a family commonly recognize many attributes of each animal. In the speeches among the family members, however, the way of reference to each animal gradually converges to a specific combination of its attributes. One of the applicable expressions of a given animal is converted into its proper name after repeated reference to it. This is the second type of livestock individual name, although no one give names of this type on purpose. These names are not called to the subjects.

Livestock names of this type are combinations of classificatory terms. This type of name giving clearly differs from the classificatory distinction of individuals. Each classificatory criterion should be evenly applied to all the members of the herd in the classificatory distinction. In the name giving, the criteria of the classification are not used equally. Some animals are named after the owner and the color, and some others after the owner and the ear markings, etc. Therefore, each

individual in a herd of 300 goats can be specified by referring to only two or three attributes.

The above ways of reference to animals are valid only for the people who share common recognition of the subjects. Animals are also referred to descriptively between persons who do not share the recognition. For example, people should exchange information on the lost animals with those who possibly find them. Animal attributes referred to in this situation are: coat color, ear markings, horn shape, brand, body size, developmental stages, possible partners wondering together, etc.

In conclusion, there are three distinct types of referring to animals in the Turkana's conversations. The first is the conversion of names of address to names of reference. The name giver is always obvious, and the names are purposely given to the animals. The second type of name is formed by the conversion of descriptive references to animals. Descriptive terms turn into proper names through socialization. Among a group of people such as the members of a family, specific terms become to be selectively used through repeated use of the terms in their speeches. The third is descriptive referring to animal attributes in the conversation with strangers. This is not a proper name, but a set of attributes. Note that the subject referred to by the second type of name is the animal itself, while the terms employed are almost all the same with those of the third.

4-3-3. Animals, in particular oxen, in songs

In East African pastoral societies, it is widely distributed that each man composes and sings songs on his favorite ox. The ox is referred to by a variety of terms figuratively in the songs, and men take their "ox-, or cattle-name" from these terms (e.g., Evans-Pritchard 1956, Lienhardt 1961, Gourley 1972). The Turkana also have ox-names. Each adult man is called as "father of so-and-so ox", as among the Jie (Gulliver 1952). The ox songs composed and sung by men are called ngimongin, the very term meaning oxen. This indicates the special status the cattle occupy in the Turkana's culture.

The oxen are referred to in such songs by a variety of terms: "spotted on the belly", "zebra", "tall", "black ox", "nalinga [pattern term] -kiryoona [black] -komar [a kind of horn shape]", "son of nakomar [a

kind of horn shape, this term refer to its mother]", etc. The oxen are also addressed to in the songs by such a variety of terms as: "loowoi [tall] -angole [pattern term]", "old", "ox of so-and-so [name of the singer's friend who gave the ox to him]", "lopeta [a kind of horn shape]", etc. There may be little difference between the terms of referring to and those of addressing to the oxen in the songs. Sometimes it is difficult to judge whether the terms are referring or addressing to the oxen.

What the poetic and figurative expressions refer to is always apparent to the audience, as well as to the singer himself. The singer is not enumerating the proper names of oxen. He is descriptively referring or addressing to them. All expressions in the ox songs are not converted into proper names commonly used in the speeches of the Turkana. Most of them are expressed only in the songs, and only a few of them are changed into such proper names as are used regardless of the context.

5. Concluding remarks

5-1. Functional aspects of livestock individual identification

Individual animals are classified by several attributes into such categories as reproducing males, parous females, or animals of specific horn shape. They are not discriminated from others of the same category. In this regard, a group of individuals is treated as a "class", each member receiving the same treatments just because it belongs to the category. For example, matured non-castrated males are always subject to the consideration whether to castrate or select as reproducing males. The techniques to produce these categories are indispensable for the pastoral livestock management.

On the other hand, a Turkana individually identifies all the animals he keeps. Setting aside the question how each "individual" animal is "unique" for the Turkana, an individual is, without doubt, discriminated from others. It is also notable in the ethnographies on African pastoralists that their livestock management is based on the individual identification. This fact, however, has not attracted the attention of anthropologists, probably because it was a matter of course. I would like to discuss its functional importances and consequences in the relationship between man and animals in pastoral societies.

Individual identification does not always constitute an indispensable element to the pastoral production. Among the Lapps (Ingold 1980), the individuals of reindeer are not completely identified, and the ear marking plays a vital role in the identification of the owners. The Lapps practice carnivorous pastoralism, while African pastoralists milch pastoralism (Ingold, 1980). Individual identification of livestock is an important concomitant of the pastoralism exploiting the livestock's milk production.

In milch pastoralism, mother and offspring must be kept separately to prevent the offspring from suckling so as to reserve the milk for human consumption. Then, people have to make the pair of the mother and offspring meet again. It is necessary first of all for the nutrition of the offspring. Secondly, especially for cattle, the encounter of the pair is necessary for milking itself. The milk of cows is secreted by the

physical stimulus of the offspring's suckling. This is known as the "milk-ejection reflex" (Amoroso & Jewell 1963). People should make the pair encounter and separate them repeatedly for exploiting milk.

If they did not identify individuals and depended, in order to milk the mother, only on the animals spontaneous encounter, it would take much time and effort, and it would be almost impracticable when the number of animals is large. Pairs could be identified not by individual identification but by putting the same marking to each of the pair, without making overlaps among the pairs. None of the pastoralists, however, practice markings of this kind. Individual identification by the appearances is easier than to the identification by the markings.

Individual identification also enables the Turkana to recognize genealogical relationships in the livestock, for the genealogical lines are made up by connecting pairs of the mother and the offspring one by one. The recognition of genealogical relationships is reported in many pastoral societies in East Africa (e.g., Evans-Pritchard 1940, Umesao 1966, Fukui 1979, Imai 1982), although the consequences of the recognition and generational depth may vary from society to society. Here again, it might be possible for the people to recognize genealogical relationships of the livestock without individual identification. The mother and offspring recognize each other, and the mother refuse newborns other than its own to suckle. It is possible to capture the offspring at the time of suckling, and put it the same marking as the mother. If people should repeat this over generations, the same marking would be put to all of the matrilineally related animals. However, there are a great number of matrilineal groups in the herd of a man as shown in this paper. Actually, it is infeasible to give each of these group an independent marking, and to put them to all animals. The trouble is easily avoided by individual identification of animals.

Individual identification of animals is also important for confirming the ownership. When the individuals are not identified, some markings should be put to the animals to identify the owners, because animals of different owners sometimes mix and stray away while grazing. All the newborns should be put the owner's marking by identifying the mother, and the markings should always be renewed each time when the animals are transferred. Ownership marking of this type is actually practiced among

the Lapps (Ingold, 1980). All of these are unnecessary when animals are individually identified.

In East African pastoral societies, the right over livestock is more complex in East African pastoral societies than to identify only the owner itself. For example among the Turkana, we can recognize the following three strata in the right over livestock within the family of a man: the family head, the sub-units of wives, and the individuals. All the livestock of a family are ostensibly owned by the family head. The livestock, however, are allotted to his wives, and it is decided beforehand from which wife the meat of an animal should be shared out, when it is slaughtered or died. The wives with their children constitute the sub-units of livestock ownership within the family. Furthermore, each animal is allotted again to individuals within the sub-units. Each person has such animals of his/her own that he/she has exclusive right over the milk produced by them. The person who has the right over a female's milk has also the potential right over the milk which its offspring will produce in the future.

The recognition of genealogical relationships among the livestock is made through the individual identification. The right over livestock becomes clear by the recognition of genealogical relationships, because all the members of one matrilineal group primarily belong to one person automatically.

The right over livestock is more complex than is described above. Some part of milk production is shared only within the sub-units of wives. Therefore, when the lactating females are unevenly distributed between sub-units, the right over the milk of some females are transferred temporarily for only one lactation period. At the end of the period, the female animal, which was handed over, should be returned. No female of the same category can substitute it. In this situation, when a females is loaned, the one who has the right over the meat of the female differs from the one who has the right over the milk of the same animal. That is, the rights over the products of one individual animal are stratified. It is impossible to record such multiple rights over livestock by putting some distinctive markings on all animals.

The principle that a specific individual animal cannot be substituted by others holds also in the livestock transfer between families among the

Turkana. Livestock are given to or exchanged with other men, and a certain social relationship is established between the persons concerned. Gulliver (1955:197) called the men who have social relationships with one man as his "stock associates". People remember firmly in mind each livestock transfer with stock associates. Each transfer is as an independent event represented by specific individual animals. They do not treat the transfer as the movement of anonymous "head" of animals, although the category of transferred animals is important.

Livestock is not loaned to other families among the Turkana in our sense. In the exchange of livestock, however, it frequently happens that two concerning persons do not hand over the livestock simultaneously. The delay of the payment on one side sometimes exceeds more than a few years, especially when the concerning persons have a close social tie. Usually such persons mutually have accumulated debts with each other. These debts are not general ones caused by the past assistances, but specific ones in which the payment for the past exchanges of livestock are not completed. In these situations, each debt is treated as a distinct one from others. The Turkana do not treat the debts as "you owe me such and such head of animals", but as "you have not met the debt which incurred when I handed you so-and-so animal". Therefore, the debts of both sides might increase even when they hand over the same head of animals to each other, because each transfer might create new debts. This situation would not occur, if the debts should have been counted by "head", not by the "individuals", of animals.

Some peoples in East Africa practice loaning of animals (e.g., Pokot: Schneider 1953, Gogo: Rigby 1969). What are loaned are not such abstract beings as animals of certain categories, but actual individual animals. When the loaned animals die, or when they are handed back to the original owner, the social relationship comes to an end. The individual animals are not substituted by others when they die, although the concerning persons can renew their relationship by the transfer of other animals.

In East African pastoral societies, human social relationships are created and maintained through the inter-exchange of livestock, each of which bearing the burden of rights specific to it (e.g., Baxter 1975). Each transfer of livestock should be recognized as a distinctive one because it represents specific social relationships created and maintained

by the transfer. Generally, the distinctiveness of each transfer may be given by several ways, such as by the date or document of the transfer. In East African pastoral societies, this distinctiveness is given by the livestock individuality.

5-2. Folk classification and peculiarity of livestock individuality

Some categories in the Turkana's livestock classification are formed by classifying natural, so to speak, given differences. It depends, of course, on the people themselves to which of these differences they pay attention and which of the differences they choose as distinctive features in the classification. In this sense, classification system is not prescribed directly by the natural differences, but formed by man's inter-relationship with the livestock. However, it may be said that some categories, based on such differences as between livestock species and between sexes, are formed paying attention to natural discontinuities.

On the other hand, some categories in the livestock classification of the Turkana are artificially formed by such techniques as deforming horns and ears and putting brand markings. High variety in the livestock coat color is maintained also artificially by selecting reproducing males of specific coat colors, although this technique does not directly produce discontinuity in the livestock as the other techniques do. Livestock are unique subjects in the folk classification systems of natural organisms in that some of distinctive features are artificially produced. They are manipulatable. Livestock individuals function as the media of displaying these artificial discontinuities.

Although each practice to produce artificial categories in livestock has some meanings, I suppose that the ultimate character of the Turkana's creation of discontinuities is not creation of categories of some meanings, but creation of differences between individual animals. However, it should be noted that each category belongs to the classification system and an individual cannot be logically discriminated from others of the same category. Therefore, the relationship between the recognition of classificatory categories and that of individuals should be discussed below.

Humans depend on such outward appearance as the coat color, body size,

horn shape, ear markings, developmental stage, etc., to discriminate a specific individual animal from others and to identify it. However, the specific individual is not identified by applying all of the various classificatory criteria one by one. When a man identifies a specific animal, he judges it as a whole, not by checking each of the animal's attributes as in the identification of a botanical species by the key. It may be possible to arrive at a category, which consists of only one element (i.e., one individual animal) by applying many criteria in the accumulating classification. The distinctiveness of individuals, however, is not given through such manipulations. Tani (1976) pointed it out that the identification of individual animals is a different way of recognition from the classification, in that distinctive features are applied not evenly to the members in the individual identification. The individuals' distinctiveness cannot be reduced to the classificatory categories.

Biologically, individuals can be recognized in all animal species. Therefore, one might think it is a matter of course that a livestock individual is recognized as a distinct being from others. Peoples under different cultures, however, recognize the individuality of animals in different ways from one another.

The Lele in Zaire (Douglas 1957) regard domestic animals as anomalous because they have individual differences, while wild animals are uniform and not differentiated from one another in one species. That is, their recognition of individuality is different according to the subjects, although the biological level of individual is all the same for both the domestic animals and the wild animals. As Levi-Strauss (1966) clearly points out, the notion of individuality is sociologically determined, as well as the notion of natural species.

On the other hand, on the classification system based on the natural model, Levi-Strauss (1966) states, "the natural 'distinctiveness' of biological species ... furnishes thought with a means of access to other distinctive systems" (p.136). He states, "the importance of the notion of species is to be explained ... by its presumptive objectivity: the diversity of species furnishes man with the most intuitive picture at his disposal and constitutes the most direct manifestation he can perceive of the ultimate discontinuity of reality" (p.137). Aspect of the sort in animal species comes to the fore, because the uniformity of animals in one

species arouses considerable attention of the people, even though animals have the aspect of individuality. Levi-Strauss (1966) discusses that an animal appears as a conceptional tool with multiple possibilities through its double character of organism: the organism itself forms a system, and the individuals constitute the elements of a species which is again the element of a higher system.

However, what man pays attention to below the level of species is not the individual. Such attributes of organisms as organs, behavior, and conditions, are paid attention to. This inclination is apparently shown in the analysis of human names by Levi-Strauss (1966). Even when the classification of humans descends down from the level of society to the level of individual persons, the distinction between individuals in one natural species does not draw man's attention, and the specific individuals do not come to the fore of human recognition.

The level of individuals in domestic animals, unlike wild animals, occupies an important part when humans form a picture of the subjects. The distinction of livestock individuals calls human attention, partly because they retain much more intimate contact with humans. The other reason is that livestock have great individual variations in their coat color compared with wild animals. The level of individuals of domestic animals offers human cognition the direct images of the discontinuity, as the level of species does. In this regard, the domestic animals are peculiar beings. This peculiarity makes the Lele classify the domestic animals as anomalous.

Livestock individuals are, like humans, distinguished, while individuals of wild animals are not. That the Turkana artificially differentiate livestock rather excessively is interpreted as their constant effort to emphasize the discontinuity between individuals, by putting them visible artificial varieties.

5-3. Consequences of livestock individuality

Tani's discussion (1976) is helpful for understanding consequences of the subsistence, which the people in question practice, on human thoughts. He discussed it, expanding Haudricourt's idea (1969) as follows: when people adopt a means of thought on their world from their surroundings, it is natural that the means is adopted from the sphere of actual feelings of

their daily life, and one of them is the subsistence subjects. Some characteristics of the relation between man and the subsistence subjects sometimes deeply influence man's thought. People recognize the subsistence subjects in certain specific ways and deal with them according to the recognition. These ways sometimes furnish the people with a means of thought on their world of other domains (Tani 1976).

What he stresses is not an environmental determinism. It depends on the people themselves whether or not they adopt their pictures on the subsistence subjects as a means of their thought on other domains, and the subsistence subjects do not prescribe man's cosmology unconditionally. He implies that man's thought does not come from nothing, but man uses the phenomena around him to which he is accustomed when he develops his views on the cosmos.

I would like to discuss the cognitional significances of livestock peculiar individuality following Tani's viewpoint. The first material is the "identification" (Seligman & Seligman 1932) between man and cattle. This custom is widely distributed among East African Nilotic pastoral peoples (e.g., Evans-Pritchard 1940 and 1956, Clark 1952, Gulliver 1952, Lienhardt 1961, Dyson-hudson 1966, Beidelman 1966, Almagor 1972, Gourlay 1972, Fukui 1979). Also among the Turkana, each adult man is called by such a name as "apa [father of] so-and-so (ox)".

The identification occurs not only between an adult man and an ox, but, more generally, between man and cattle in various levels according to Evans-Pritchard (1956). For example among the Nuer, the initiation dance is called by the same term as a bull calf which will be castrated in future, and the cutting of marks of manhood in the boy's forehead at the time of initiation is called by the same term as the operation of horn training. These examples show that there is a kind of identification between men and oxen generally. Further, the human-cattle relationship is transmitted over generations. Suppose a clan or lineage ancestor had a particular herd in a specific relationship. Their descendants would keep the same relationship with the descendants of the herd. The identification exists between human social groups and cattle herds (Evans-Pritchard 1956).

However, Evans-Pritchard (1956:254) himself states that "the ox of initiation [a bull calf is given to a boy from his father at the time of initiation, and it will later be castrated] is the proto-type of the man-

animal relationship, and it is a kind of focal point at which the feeling a Nuer has toward cattle converge". The basis of the identification of various levels is the relationship between an individual man and an individual specific ox.

Living together with livestock, pastoral peoples identify and emphasize livestock individuality. Each livestock is distinguished as a man is. This recognition furnishes people with the model for firmly recognizing the man's individuality, as well as the means of expressing it.

Furthermore, Evans-Pritchard (1956), classifying the Nuer sacrifice into two, personal and collective, stresses the importance of the former for the understanding of Nuer religion. He states (1956:285-286), "the role of this religion in the regulation of the social life, its structural role, is subsidiary to its role in the regulation of the individual's relations with God, its personal role". He states that the relation with God is individually established among the Nuer, and that "this sense of dependence [on God] is remarkably individualistic" (1956:317). It seems to me that the individualistic bond with the God might be related to such recognition of oneself as being distinctive from others. They characteristically emphasize the level of individuals which is backed up by the expressive means of animal individuality.

It is another question whether they have the same consciousness of oneself as ours, as an inner entity. It should be noted that the level of individuals is emphasized in their consciousness of themselves. This emphasis never rejects other levels.

Among East African pastoral societies, it is discussed that the individual independence is highly evaluated compared with agriculturalists (e.g., Goldschmidt et al. 1965). Evans-Pritchard (1940) left impressive descriptions on the differences of attitude to others, comparing the Nuer with the Azande. Itani (1980b) also stressed how the Turkana's attitudes differ from those of the Tongwe, an agricultural people in Tanzania. It seems to hold true widely that the pastoral peoples have different interpersonal relationships from agricultural peoples.

Goldschmidt (1971) states, "the independence syndrome (p.135) [in pastoral societies] ... recurs as a cultural attitude in response to the requirements for animal husbandry under the environmental and technological circumstances in which these societies operate (p.141)". He explains that

pastoral people are independent minded because each man must always make decisions as an independent entrepreneur under severe circumstances. Decisions on migratory routes, stopping place, collaboration with others, culling of animals, etc. affects the herd's welfare, which directly leads to the welfare of the family members.

From the ecological viewpoint, it is adaptive that the population of livestock is dispersed widely in small units under such dry and unstable environment as semi-desert where the pastoralists usually live. Therefore, it is better for each family to constitute an independent unit of nomadic movements by itself. Goldschmidt's functional explanation seems correct for understanding the fact that each man becomes an independent enterprising man in pastoral societies.

However, his discussion does not explain why the individual independence is highly evaluated among pastoral societies. I suppose that the high evaluation of individual independence among pastoral people can be interpreted from the viewpoint that the indisputable individuality of livestock is at the people's disposal, that they emphasize it, and that they access to the human individuality with it.

ACKNOWLEDGEMENTS

This research was financed by the Ministry of Education, Culture and Science, Japan (Grant-in-Aid for Overseas Scientific Research Nos. 53404321, 55504132 and 57041005). My field study was undertaken in the capacity of research associate at the Institute of African Studies, University of Nairobi. Professor B. E. Kipkorir, the then Director of the Institute, kindly gave me assistance in carrying out fieldwork. Professors J. Itani of Kyoto University, and J. Tanaka of Hirosaki University gave me great help in conducting fieldwork, and in writing this paper. The manuscript benefited from the comments by Drs. M. Kakeya, M. Ichikawa, and S. Sato, and H. Takasaki. Colleagues at the Laboratory of Human Evolution Studies, Kyoto University, encouraged this study. Mr. A. H. Ardung helped me as an excellent interpreter, as well as a genuine friend in the research field. Other numerous Turkana people offered me friendship. To these people and institutions I make grateful acknowledgements.

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footnote 1.

The Turkana, Eastern-Nilotic speakers (Gregersen 1977), live in a semi-desert in northwestern Kenya. Most of them live in the Turkana District, in which their population is about 140,000 (Kenya Population Census 1979). They keep cattle, camels, goats, sheep, and donkeys, and highly depend on their products. My study station was located about 8 km north of Kakuma, a small town which lies 120 km northwest of Lodwar, the center of the District. Intensive surveys were done in the northwestern part of the Turkana territory. The study period was fifteen months in total: June 1978-Feb. 1979, Aug. 1980-Jan. 1981, Sept.-Oct. 1981, and July 1982-Jan. 1983.

footnote 2.

For the details of Turkana folk classification of organisms, see Itani (1980a). Itani (1980a) considered the category of livestock (ngibaren) as a sub-category of mammals (ngitiang) first. However, Itani (1985) corrected his view and made the category of ngibaren as distinct from ngitiang.

footnote 3.

I heard that people in southwestern part of the Turkana territory sometimes castrate reproducing males.

footnote 4.

Details of three castration methods are as follows:

(1) Akidong (by beating)

The scrotum is pulled down, and a log is set under the stretched part. This part is then beaten with a wooden hammer cutting off the seminal duct inside. This process is performed without shedding blood. The operator confirms with fingers that the duct is surely crashed off. The testes of operated males will fail to function in due course, and become atrophied. The Turkana explain the effect of this operation that males will be unable to copulate because it is the seminal ducts that provide the penis with strength.

Generally the castrated male is referred to as lodongon (see Fig. 1), which is a derivative word of this castration method. The Turkana do not have a term to mean castration in general, but, in a wide sense, akidong can be regarded to stand for it.

(2) Agelem (by cutting)

The scrotum is cut open with knives, and the testicles and seminal ducts are removed. The scrotum is in some cases cut in both side so as to remove both testicles, and in others, the testicles and seminal ducts are pulled out from only one opening. The opening is not treated after the operation. Only the scrotum is slightly massaged. Best (1983) translated agelem as "to castrate", but this term is applied only to the castration by this method, and does not signify castration in general.

(3) Akikony (by biting)

While the above two terms for castration methods signify the very specific methods, this term generally means "to bite off". The seminal duct is bitten off inside. The blood is not shed. This method is applied only to young males of stage I in Fig. 1, except for camels and donkeys. It is always only one seminal duct which is treated by this method, and the other is left untouched. Therefore, in a narrow sense, this is not a castration, because males' ability to reproduce is sustained. After the operation, the treated male has only one testicle. This condition vitalize males, the Turkana say. Some of the treated males become castrated males in the future by further operation of the remaining testicle, and others become reproducing males without further operation. The Turkana often

remove one of the testicles of reproducing males of cattle, goats, and sheep. Some Turkana say that those reproducing males which do not undergo this operation sometimes die, becoming skinny little by little.

All three techniques are applied to cattle, goats, and sheep. The technique employed changes from akikony (biting) to agelem (cutting), and to akidong (beating) according to the growth stage of males. In the cases which I directly observed, the age of the operated males varied considerably among cattle. Thirteen young males of about 2 to 8 months were operated by agelem at the same time. Possibly males are operated even at the age of one month, because the Turkana say that they sometimes castrate males before they are driven out for herding. I also observed an male of about 24 months castrated by akidong. The Turkana concerned said that they had been considering of selecting the male as a reproducing male, but that they abandoned the idea. The common cattle age for agelem is up to around 12 months. Those over 18 months should be operated by akidong, otherwise the male will die because of blood shed, the Turkana say.

In the cases of goats and sheep, only a few males are operated by agelem, and most males are castrated by akidong after they have sexually matured. For the males of which I could ascertain the date of birth, castration by akidong was performed at the age of: 8 months, 1 male; 12 months, 4 males; 15 months, 7 males; 16 months, 1 male; 19 months, 2 males. The average is 14.3 months (N=15).

Among the 22 males which were born between Sept. 1980 and Apr. 1981, and were present in Aug. 1982, seven were already selected as reproducing males, and all the remaining fifteen have been castrated. This shows that at least at the age of 16 months, those which are to be castrated are operated. In contrast, among 13 males born in Aug. 1981, all but one were not castrated yet in Aug. 1982, and these non-castrated males were not selected as reproducing males. These data suggest that goat males are castrated at the age of 12-16 months. Although I do not have any data for the timing of sheep castration, they are treated in the same way as goats.

Male camels are castrated only by agelem (cutting off). The Turkana say that the method of crashing seminal ducts off is impossible to apply to camels, because their testicles are not hanging down, unlike those of other livestock. Castration is said to be performed after the age of at least 24 months. Two male camels, which were ascertained to have been born before

Sept. 1980, had not been castrated yet in Dec. 1982, when they were older than 26 months.

Only akidong (beating) is applied to male donkeys. The Turkana say that the donkey will die if treated by agelem. The operated donkey should be kept in the village for a few days after the operation, tying them by ropes at the neck. Otherwise, they would run around because of the pain in the scrotum, and some would die, others would be lost, say the Turkana. Donkeys are not castrated until they sexually mature and begin to copulate. The Turkana say that the donkey herd would be scattered and some animals would be lost if the herd should include too many mature non-castrated males. The reasons for the delay of castration among donkeys in spite of the above mentioned Turkana's recognition of possible herd disintegration are: the donkeys will sometimes die because of the castration, and the donkey herd is usually not so large as to include many males.

footnote 5.

The parturition is classified into four categories. The Turkana explain each of them as follows:

- (1) Akiyeshi: this term means "to abort" generally. In some cases, the mother will lactate normally if it is milked little by little, according to the Turkana. It is considered to cause human sterility to eat aborted and still-born babies, and only old men and children can eat them.
- (2) Akilengulyangooni: this means also abortion with the babies more developed than those in category (1). They survive in some cases, and die in others. The mothers can be milked.
- (3) Akiteteunit: the babies thrive, although this is also a premature delivery. In case of goats and sheep, the premature infants are put into wooden vessels (atuba) and fed with the mothers' milk, which is poured into their mouth through a pipe-like utensil (akarapanyat) made of leather. The infants gain their vigor in five days, say the Turkana. These infants are kept in the human sleeping place, separated from other infants, and people continue to help them suckle the mother until they begin to walk around firmly. The mothers are milked normally.
- (4) Auri: this term means "to give birth". Normal parturition is indicated by this term. It is applied only to non-human animals.

The herders pay surprisingly delicate attention to the females' condition of gestation. They can list up the females which are supposed to give birth on a certain day. Such expectation of the herders did not fall short of more than two days. Herders say that they know it from various signs: females stop walking as if they were feeble, their nipples swell out, and their vulvae become open.

At the time of parturition, people help the mother as much as possible, pulling the infant out. This help is rendered to all livestock except for donkeys. After the infant stands up, people seize the mother in order to make the infant suckle. According to my observation, first suckling occurred at least within one hour after the parturition among goats. People try to keep the mother and the infant together for 1.5 - 2 hours after the parturition, and to make the mother lick the baby.

footnote 6.

All the livestock, except for donkeys which are not milked, are usually milked twice a day: in the morning before leaving for day-trip herding and in the evening after coming back to the homestead after grazing. When animals do not produce much milk, they are milked only in the evening. Camels are milked 4-5 times a day when they produce much milk. A cow gave 706 ml of milk on average (N=91, morning:754 ml [N=41], evening:667 ml [N=50], 1421 ml per day) in a short rainy season (Nov., 1978). In another good rainy season (Feb., 1979), a cow gave an average of 467 ml (N=93, morning:431 ml [N=31], evening: 485 ml [N=62], 916 ml per day) of milk. A camel gave an average of 1064 ml (N=64) of milk in the same season as above. Because camels were milked three times a day (morning:921 ml [N=32], daytime:1142 ml [N=10], evening:1236 ml [N=22]) at that time, a camel produced 3299 ml daily. In a short rainy season after a severe drought (Nov., 1980), a camel gave 2068 ml daily (5 am: 619 ml [N=34], 9 am 315 ml [N=10], 6 pm: 717 ml [N=17], 9 pm: 417 ml [N=7]). A goat gave an average of 270 ml (N=38, morning: 233 ml [N=6], evening 277 ml [N=32]) in Feb., 1979 (510 ml per day). In a short rainy season after a severe drought, a goat, which gave birth before one month, gave 284 ml (N=69) in the evening and 123 ml (N=50) in the morning (mid-Dec., 1980, 407 ml per day). In the end of January 1981, Same goat gave 144 ml (N=42) in the evening and 76 ml (N=40) in the morning (220 ml per day).

footnote 7.

The Turkana take great care of mother-offspring bond, i.e., mothers' recognition of their offspring. Mothers, especially of goats and sheep, the Turkana say, sometimes fail to recognize their offspring, and refuse them to suckle. This makes a great problem for the offspring's nutrition. Further, they say that they can get more milk in quantity from mothers, if they are suckled by offspring before milking.

When the mother refuses its offspring, the Turkana take the following countermeasures. These are also practiced in the case of adoption

(akironyakin), which is necessary when the mother dies after parturition.

(1) The mother (or the foster mother) is caught and milked a little. Then they smear the milk to both the mother's mouth and the offspring's buttock.

(2) One of the offspring's foreleg is squeezed into the mother's vulva.

(3) The mother's vulva is closed by hands, or tied by strings to close.

(4) Mixture of salt and ash is smeared in the vulva of the mother. Then people blows into the vulva by attaching the mouth to it.

(5) People seize a puppy, and take it in front of the mother's face. The mother will rush against it, and the puppy will whine. This process is done repeatedly.

After one of or a set of these measures are taken, the offspring is taken to the mother to suckle. All these measures are applied to cattle, goats, and sheep, except for method (2), which is only for goats and sheep. Method (1) depends on the animals' habit that the mother recognize the offspring by the smell. On the effects of methods (2), (3), and (4), the Turkana say that these measures give the mother an illusion of giving birth, and the mother accepts the offspring which is brought close to it. On the method (5), they explain that the mother becomes aware of the offspring's presence through the reaction to becoming aggressive to puppies.

They do not have any countermeasures for camels. For donkeys, heavy leather bags filled with sand are put on the back of the mother, then the offspring is taken close to the mother to suckle.

footnote 8.

When the offspring die after the birth, the following three measures are taken to keep the mother's lactation: (1) to make a dummy with the skin of the dead offspring, (2) to adopt the other's offspring, and (3) to bring the already weaned offspring precedent to the dead and make it suckle again.

The dummy is made only for cattle and camels. Grasses are stuffed into the skin of the dead offspring, and the dummy is roughly made look like a log. It has no specific name, and called as elou-a-itaok [skin of a calf]. At the time of milking, the dummy is put against the mother's nose. After the mother smells it, it is put on the ground in front of the mother. Then the mother is milked. The Turkana have no such concomitant technique as to smear the mother's urine to the dummy reported for other pastoralists (Evans-Pritchard 1940, Amoroso & Jewell 1963, Cranstone 1969).

There are two ways of adopting the offspring which is born almost at the same time with the dead, adoption without cutting the offspring's social tie with its real mother, and adoption of one of the twin, which are often born among goats and sheep, separating it from its real mother. The same measures are taken in both cases.

When the precedent offspring are made suckle again, they are put into the herds of newborns in order to separate it from its mother and to prevent it from suckling in the daytime. This measure is possible only when the precedent offspring is still young enough to suckle the mother. Sometimes these young offspring cause another problem. When two offspring are given birth successively, and if there are only two herds, i.e., infant herd and adult herd, the younger one can be separated from the mother, but the elder one is put into the same herd with the mother. Then, the elder offspring will sometimes suckle the mother during the daytime herding, leaving no milk for human consumption. An instrument is used for preventing the offspring from such suckling. A tiny twig is scraped into V-shape, one of the fork is pierced through the nasal septum of the offspring. Then the tips of fork are tied by strings to prevent it from falling off. At the same time, the offspring's nose is slightly cut by knives. The offspring can not suckle because of the obstructive branch, and also of the pain in the nose.

footnote 9.

Both -bok and -kipurat signify pale purple-red, pale brownish purple, or pale brownish blue. I investigated color terms by showing 98 color cards one by one at random to 14 (9 men and 5 women) informants. Among them, one used neither of the above terms, three used only -kipurat, four used only -bok, and six used both of them (I exclude the answers composed of more than one term). Totally 19 cards are referred to by -bok and/or -kipurat. To nine of them, some informants named -bok, and others named -kipurat. This results suggests that -kipurat and -bok are synonyms. The Turkana, however, maintain that these two colors are different from each other. When these terms are applied to livestock coat, it seems to me that -kipurat signifies more purplish color, while -bok brownish. These two terms need further examination.

footnote 10.

Coat color inheritance of cattle is maintained by the following three series (Nozawa, personal communication; Searle 1968):

- (1) W/w; white/not white,
- (2) $E^d/E/e^{br}/e$; black/extension of black/brindled/red,
- (3) S/s; self/spotted.

The genotypes of most bulls among the Turkana probably fit to one of the following sets:

- a. Ww, E^d- , S-,
- b. Ww, E^d- , ss,
- c. Ww, E-, S-,
- d. Ww, E-, ss.

footnote 11.

Finch & Western (1977) explained the variation of cattle coat color in Kenya from the viewpoint of natural adaptation. Cattle of light color are adaptive in the areas of low altitude, while cattle of dark color are adaptive in the areas of high altitude, according to them. In northwestern Turkana, it may be adaptive that a cattle herd of one family includes animals of various coat colors because it usually migrates in a wide range of altitude between 600 and 1500 m. However, I do not suppose that the Turkana maintain the wide variety in cattle coat color because of this adaptive value. I do not suppose that they take this value into considerations.

footnote 12.

Goat which had already developed the second set of one incisors (I_1) were classified as 1 year old; I_1 and I_2 as 2 years old; I_1 , I_2 , and I_3 as 3 years old; I_1 , I_2 , I_3 , and canine teeth as more than 3 years old.

footnote 13.

In a goat herd including 129 mature females, 26 females gave birth in Sept., 1980, and 54 females in late Nov. - early Dec., 1980. In a herd including 175 mature females, 112 gave birth in mid-Sept. - early Oct., 1982.

footnote 14.

The unit formation of Herder A did not strictly agree with the actual ownership. One of the three females of the 2nd wife was included in the unit of the 4th wife. I could not find it when I was in the study field, and missed to check its reason.

footnote 15.

Males of donkey are given names when they are utilized as pack animals. Among studied donkeys, there is one male donkey being given proper name, which I exclude from the following analysis, because the remaining named animals are all females. Except for donkeys, only a few animals other than parous females are given names, which are commonly used by the family members. A reproducing male goat, for example, is named apuchono (from akipucho [open one's eyes wide]) after its facial expression at the time of copulation.

footnote 16.

Members of this set wear black ostrich feathers, while members of the other set, ngirisai, wear white and gray feathers; see, Gulliver, 1958.

Table 1. Classification of gestation stages

stage of gestation	duration in sequence (month)		
	cattle	camel & donkey	goat & sheep
<u>akikap</u> (1st stage)	7	10	3
<u>akiwochun</u> (2nd stage)	1	1	1
<u>akitaalakin</u> (3rd stage)	1	2	1
total	9	13	5

Table 2. Roots of horn shape terms

horn shape	root
1. <u>-poponga</u>	<u>akipopong</u> =to curl up
2. <u>-keryaman</u>	<u>akiryam</u> =to adjoin, be adjacent
3. <u>-dyepa</u>	=to be unsymmetrical, not uniform
4. <u>-ngeleshi</u>	<u>akingeleshi</u> =to slip out of position
5. <u>-ryonga</u>	<u>akiryong</u> =to carry something on the shoulder
6. <u>-ita</u>	=(point) to be sharp
7. <u>-peta</u>	<u>apetari</u> =to spread out
8. <u>-koda</u>	<u>akikod</u> =to make a carrying handle

For each horn shape, see Fig. 4.

Table 3. Horn types shaped
naturally or by training

horn shape	way of shaping	
	trained	natural
1. <u>-dyepa</u>	+	+
2. <u>-komar</u>	+	+
3. <u>-luk</u>	+	+
4. <u>-kodos</u>	+	+
5. <u>-ita</u>	+	+
6. <u>-poponga</u>	+	-
7. <u>-keryaman</u>	+	-
8. <u>-koda</u>	+	-
9. <u>-chongor</u>	+	+
10. <u>-ryonga</u>	+	+
11. <u>-ngeleshi</u>	+	+
12. <u>-peta</u>	+	+
13. <u>-bakar</u>	+	+
14. <u>-todo</u>	+	+
15. <u>-lim</u>	+	-
16. <u>-thongoli</u>	-	+
17. <u>ngidonge</u>	<u>+</u>	+
18. <u>-nanguru</u>	<u>+</u>	-

For each horn shape, see Fig. 2.
+:shaped by training or naturally,
-:not exist,
+: formed accidentally.

Table 4. Ear cut distribution in four goat herds

ear cut type (left-right)	number of goats											
	herd A (Dec.1982)			herd B (Nov.1980)			herd C (Nov.1980)			herd D (Nov.1980)		
	M	F	T	M	F	T	M	F	T	M	F	T
1. 0-0	67	91	158	35	53	88	8	19	27	2	1	3
2. 2-2	26	71	97	5	37	42	7	23	30		4	4
3. 2-0	8	54	62	2	25	27		1	1	2	3	5
4. 0-2	3	20	23		11	11		5	5			
5. 3-3	7	1	8	1	3	4	3	1	4			
6. 2-3		5	4		4	4		1	1			
7. 0-3	2		2	1	2	3						
8. 4-4	1	1	2		1	1	1		1			
9. 0-4	1	1	2	1		1						
10. 4-2		1	1	1	2	3		1	1		1	1
11. 2-4		1	1									
12. 4-0		1	1	1	1	2						
13. 4-3		1	1		1	1						
14. 1-1		1	1					1	1			
15. 3-2+4		1	1		1	1						
16. 0-1+2		1	1									
17. 3-0				2		2						
18. 0-1					1	1						
19. 3-2					1	1		1	1			
20. 2+4-2+4					1	1		1	1			
21. 4-1								1	1			
22. 4-6								2	2			
23. 5-5								4	4			
24. 5-2								1	1			
25. 3-1								1	1			
26. 0-1+3								1	1			
27. 2+4-2+6								1	1			
28. short ear *	3	9	12	2	3	5						
total	118	260	378	51	147	198	19	65	84	4	9	13

M: male, F: female, T: total, 0: the ear is not cut. For other types of ear cut (1,2,...6), see Fig. 6.

A and B are same herd in Dec. 1982 and Nov. 1980. Some members are registered to both herds.

*: genetically short ears are not cut, see text.

Table 5. Ear cut difference between male and
female new-born kids in herd A
(see Table ~~3.~~
4)

	cut	non-cut	total
male	23	37	60
female	35	15	50
total	58	52	110

$\chi^2=10.97$, $df=1$, $p<0.001$

Table 6. Ear cut difference between male and female excluding kids in herds A and B (see Table 3)

	Cut	Non-Cut	Total
male	39	64	103
female	146	92	238
total	185	156	341

$\chi^2=15.97$, $df=1$, $p<0.001$

Table 7. Terms which refer to ears of livestock

Turkana term	meaning
1. <u>-mulele</u>	short ears (see the text)
2. <u>-mudan</u>	ears of middle length
3. <u>-itaangaki</u>	long ears
4. <u>-peiakit</u>	one ear is cut into <u>emunitoi</u> (see Fig. 6)
5. <u>-munimunyo</u>	both ears are cut into <u>emunitoi</u>
6. <u>-ngurubo</u>	both ears are cut into <u>engurubitoi</u>
7. <u>-itebitai</u>	both ears are cut into <u>itebitai</u>
8. <u>-meriangaki</u>	spotted ears

Table 8. Age-sex composition of the checked herd and its members' allocation to herders

category	number of goats			
	herder A	herder B	herder C	total
reproducing male	3	2	-	5
castrated male	10	9	-	19
matured male not castrated	-	12	-	12
immature male	-	-	14	14
parous female	50	22	-	72
matured nulliparous female	5	45	6	56
immature female	-	1	16	17
total	68	91	36	195

Table 9. Break-down of goats to checking units

herder A		herder B		herder C	
unit	No. of goat	unit	No. of goat	unit	No. of goat
A1	3	B1	12	C1	18
A2	10	B2	7	C2	10
A3	14	B3	4	C3	8
A4	19	B4	6		
A5	4	B5	8		
A6	2	B6	6		
A7	9	B7	5		
A8	4	B8	5		
A9	3	B9	7		
		B10	8		
		B11	5		
		B12	4		
		B13	6		
		B14	8		
total	68		91		36

Table 10. Distinctive features of checking unit formation

herder	unit & its distinctive feature	number of goat								lactation
		total	M	Mc	Mm	My	F	Fm	Fy	
A	A1. reproducing male	3	3							
	A2. castrated male	10		10						
	A3. lactating female	14					14			14
	A4. 1st wife	19					19			
	A5. new comer	4						4		
	A6. 2nd wife	2					2			1
	A7. 4th wife	9					8	1		
	A8. son's wife	4					4			
	A9. other family	3					3			
	total	68	3	10			50	5		15
B	B1. non-castrated male	12	1		11					
	B2. big castrated male	7	1	5	1					
	B3. small castrated male	4		4						
	B4. 4th wife	6					1	5		
	B5. same age,	8					7	1		4
	B6. same age (=B7), same color	6					5	1		3
	B7. same age (=B6)	5					5			
	B8. same age	5						5		
	B9. same age (=B10), same color	7						7		
	B10. same age (=B9)	8						7	1	
	B11. same color	5					2	3		
	B12. same color	4						4		
	B13. same color (=B14), big one	6					1	5		1
	B14. same color (=B13), small one	8					1	7		1
	total	91	2	9	12		22	45	1	9
C	C1. same age (=C2), female	18						6	12	
	C2. same age (=C1), male	10				10				
	C3. same age	8				4			4	
	total	36				14		6	16	
total		195	5	19	12	14	72	56	17	24

M:reproducing male, Mc:castrated male, Mm:young matured male not castrated,
 My:immature male, F:parous female, Fm:nulliparous female, Fy:immature female.

Table 11. Owners of each herder's goats

	number of goats											
owner	herder A			herder B			herder C			total		
	F	M	T	F	M	T	F	M	T	F	M	T
1st wife	37	11	48	49	19	68	16	8	24	102	38	140
2nd wife	3	0	3	3	0	3	1	0	1	7	0	7
3rd wife	5	1	6	3	2	5	2	0	2	10	3	13
4th wife	3	0	3	5	1	6	2	2	4	10	3	13
son's wife	4	0	4	1	0	1	1	2	3	6	2	8
other family	3	1	4	7	1	8	0	2	2	10	4	14
total	55	13	68	68	23	91	22	14	36	145	50	195

F:female, M:male, T:total.

Table 12. Kin-group in the
study herd

group size	No. of group
1	23
2	13
3	7
4	7
5	1
6	5
7	1
8	-
9	-
10	1
13	1
16	2

Table 13. Overlap of individual names in the livestock herd

	livestock herd									
	goat			cattle		camel			donkey	
	A	B	C	D	E	F	G	H	I	J
total no. of name	61	126	33	29	27	10	39	19	19	12
no. of overlaped name	3	14*	3	1	1	1	1	-	1	-
total no. of animal	64	141*	36	30	28	11	40	19	20	12

A,B,...: herd of livestock managed together, *: one name is shared by three individuals.

Goat herds A & B were the same herd in different study periods (A:Nov. 1980, B:Dec. 1982). 51 goats were present in both herds.

Table 14. Gender of livestock individual names

	number of livestock				
gender	goat	cattle	camel	donkey	total
with prefix					
masculine (e-)	3	2	3	2	10
(lo-)	13	-	5	3	21
feminine (a-)	79	29	20	14	142
(na-)	61	17	33	10	121
neuter (i-)	18	5	3	1	27
(ni-)	1	-	1	-	2
plural	2	1	1	1	5
without prefix	13	4	4	1	22
total	190	70	58	32	350

Table 15. Gender prefix for human personal names

sex	gender of prefix				total
	masculine	feminine	neuter	nil	
male	16	6	0	6	28
female	5	17	2	3	27

$\chi^2=11.02$, $df=1$, $p<0.001$ (for masculine and feminine).

Table 16. Attributes for naming of livestock individuals

origin	number of livestock				
	goat	cattle	camel	donkey	total
1. appearance	163	57	41	16	277
2. birth	-	-	14	8	22
3. transfer	11	-	3	6	20
4. behavior	5	1	6	1	13
5. accident	9	-	6	1	16
6. relation	2	-	-	-	2
total	190	58	70	32	350

Table 17. Attributes in livestock names referring to appearance

origin	number of livestock				
	goat	cattle	camel	donkey	total
1. one CP	19	8	4	3	34
2. two CPs	63	16	2	-	81
3. including or exceptionally NCPs					
a. animal color	28	8	4	2	42
b. animal shape	1	-	1	-	2
c. plant color	-	2	-	-	2
d. horn shape	6	4	-	-	10
e. ear cut	5	-	3	3	11
f. term of body part	16	8	6	2	32
g. others					
color only	21	10	6	5	42
shape only	2	-	6	1	9
color+shape	2	1	9	-	12
total	81	33	35	13	162

total					
color	144	52	16	10	222
CP only	82	24	6	3	115
CP + NCP	21	10	3	1	35
NCP only	41	18	7	6	72
shape	12	1	16	6	35
color+shape	7	4	9	-	20
total	163	57	41	16	277

CP: CP terms, NCP: non-CP terms (see text).

Table 18. Livestock individual names referring to its resemblance in color and shape to other animals

animal (vernacular name)	number of livestock				total
	goat	cattle	camel	donkey	
1. european (<u>emuzugut</u>)				1	1
2. Grant's gazelle (<u>agete</u>)	4	1	2		7
3. dik-dik (<u>esuro</u>)	2				2
4. zebra (<u>etuko</u>)	2			1	3
5. ?(ungulate) (<u>ekolobai</u>)	1				1
6. goat (<u>agine</u>)			1		1
7. ox (<u>emong</u>)	1*				1
8. leopard (<u>eris</u>)		1			1
9. spotted hyena (<u>ebu</u>)			1		1
10. savanna monkey (<u>ekadokot</u>)		1			1
11. ground squirrel (<u>ekunyuk</u>)	2	2			4
12. dormouse (<u>ales</u>)	1				1
13. ostrich (<u>ekaleeta</u>)	1		1*		2
14. tufted Guinea fowl (<u>atapin</u>)	1				1
15. yellow-necked spurfowl (<u>etokora</u>)	1	1			2
16. cattle egret (<u>abong</u>)	3	1			4
17. crow (<u>ekuruk</u>)	2				2
18. harlequin quail (<u>aluru</u>)	1				1
19. hornbill [<u>Tockus</u> spp.] (<u>lokut</u>)	2				2
20. bee (<u>ao</u>)	1				1
21. butterfly (<u>abeere</u>)	2				2
22. dung beetle (<u>ekolonyo</u>)	1				1
23. millipede (<u>akamuryamurya</u>)	1				1
24. wild mammal (<u>etiangit</u>)**		1			1
total	29	8	5	2	44

*:resemblance in shape, **:this name refers to color resemblance to kudu by adding the term -ase (pattern term, see Fig. 3, B9), which means striped.

Table 19. Elements and meanings of livestock names

number of livestock																			
element and origin	goat				cattle			camel				donkey			total				
	A	B	C	T	D	E	T	F	G	H	T	I	J	T					
1. one CP term	12	7	19	(10.0)	3	5	8	(13.8)	1	2	1	4	(5.7)	3	-	3	(9.4)	34	(9.7)
2. two CP terms	54	9	63	(33.2)	10	6	16	(27.6)	-	1	1	2	(2.9)	-	-	-	(0)	81	(23.1)
3. one CP term				%				%					%				%		
+ one non-CP term																			
a. appearance	24	4			8	6			3	7	2			-	1			55	
b. birth	-	-			-	-			-	1	-			-	-			1	
c. transfer	-	-			-	-			-	-	-			-	-			-	
d. behavior	1	-			-	1			-	-	-			-	-			2	
e. accident	1	-			-	-			-	-	-			-	-			1	
f. relation	1	-			-	-			-	-	-			-	-			1	
total	27	4	31	(16.3)	8	7	15	(25.9)	3	8	2	13	(18.6)	-	1	2	(2.9)	60	(17.1)
4. one non-CP term																			
a. appearance	36	14			9	10			-	5	5			5	3			87	
b. birth	-	-			-	-			3	7	3			2	4			19	
c. transfer	9	1			-	-			-	3	-			5	-			18	
d. behavior	3	-			-	-			-	3	2			-	-			8	
e. accident	7	-			-	-			1	2	2			-	1			13	
f. relation	-	-			-	-			-	-	-			-	-			-	
total	55	15	70	(36.8)	9	10	19	(32.8)	4	20	12	36	(51.4)	12	8	20	(62.5)	145	(41.4)
5. two non-CP terms																			
a. appearance	3	-			-	-			3	7	3			3	1			20	
b. birth	-	-			-	-			-	-	-			-	2			2	
c. transfer	-	1			-	-			-	-	-			1	-			2	
d. behavior	1	-			-	-			-	1	-			1	-			3	
e. accident	1	-			-	-			-	1	-			-	-			2	
f. relation	1	-			-	-			-	-	-			-	-			1	
total	6	1	7	(3.7)	-	-	-	(0)	3	9	3	15	(21.4)	5	3	8	(25.0)	30	(8.6)
total	154	36	190		30	28	58		11	40	19	70		20	12	32		350	

A,B,...J are livestock herds managed together, T:total.
For CP and non-CP terms, see text.

Table 20. Livestock names referring to more than one characteristics of the named animal

	number of livestock			
	goat	cattle	camel	total
1. CP term + body shape	2	1	9	12
2. CP term + horn shape	3	3	-	6
3. CP term + ear-cut	2	-	-	2
4. CP term + behavior	1	1	-	2
5. CP term + history	1	-	-	1
6. body shape + body shape	-	-	1	1
total	9	5	10	24

For CP terms, see text.

There is no name which refers to two characteristics among donkeys.

Table 21. Overlap of livestock names

No. of livestock which has the same name	number of names					total observed(%)	expected
	1CP	2CP	1CP +1NCP	1NCP	2NCP		
unique name	18	43	49	110	25	245(84.5)	239.679
2	5	16	4	11	-	36(12.4)	44.314
3	1	2	1	1	-	5 (1.7)	6.007
4	1	-	-	1	1	3 (1.0)	
5	-	-	-	-	-	- (0)	
6	-	-	-	1	-	1 (0.3)	
total	25	61	54	124	26	290	
(%)	(8.6)	(21.0)	(18.6)	(42.8)	(9.0)		

1CP:names composed of one CP term, 2PT:two CP terms,

1CP+1NCP:one CP term and one non-CP term, 1NCP:one non-CP term, 2NCP:two non-CP terms.

For CP and non-CP terms, see text.

$X^2=3.169$, $df=1$, $0.1 > p > 0.05$ (for the calculation method, see Takasaki [1981]).

Expected frequency of names unsampled = 648.116.

Table 22. Elements of livestock name

element of name	number of livestock										total
	goat			cattle		camel			donkey		
	A	B	C	D	E	F	G	H	I	J	
1. 1CP	5	12	7**	3	5	1	2	1	3*	-	39
2. 2CP	27#	45\$	9	10*	6*	-	1	1	-	-	99
3. 1CP + 1NCP	16	25**	4	8	7	3	8*	2	-	1	74
4. 1NCP	14	53@	15*	9	10	4	20	12	12	8	157
5. 2NCP	2	6	1	-	-	3*	9	3	5	3	30
one element	19	65	22	12	15	5	22	13	15	8	196
two elements	45	76	14	18	13	6	18	6	5	4	205
total	64	141	36	30	28	11	40	19	20	12	401

CP:CP term, NCP:non-CP term, see text.

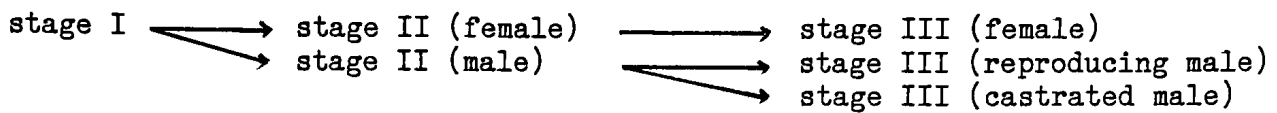
#:three names are shared by two goats respectively, \$:ten names by two, *:one name by two, @:three names by two and one by three, **:two names by two.

Table 23. Elements of livestock name

element of name	number of livestock										total
	goat			cattle		camel			donkey		
	A	B	C	D	E	F	G	H	I	J	
1. 1CP	5	12	7**	3	5	1	2	1	3*	-	39
2. 2CP	27#	45\$	9	10*	6*	-	1	1	-	-	99
3. 1CP + 1NCP	16	25**	4	8	7	3	8*	2	-	1	74
4. 1NCP	14	53@	15*	9	10	4	20	12	12	8	157
5. 2NCP	2	6	1	-	-	3*	9	3	5	3	30
one element	19	65	22	12	15	5	22	13	15	8	196
two elements	45	76	14	18	13	6	18	6	5	4	205
total	64	141	36	30	28	11	40	19	20	12	401

CP:CP term, NCP:non-CP term, see text.

#:three names are shared by two goats respectively, \$:ten names by two, *:one name by two, @:three names by two and one by three, **:two names by two.



cattle: ngaaturuk

<u>itaok</u> (<u>ngitak</u>)	<u>ataok</u> or <u>aite nataok</u> (<u>ngatak</u>)	<u>aite</u> or <u>aite naapolon</u> (<u>ngaaturuk</u>)
	<u>itaok langitou</u> or <u>iwantai</u> (<u>ngitak luangitou</u>)	<u>emaanik</u> (<u>ngimaaniko</u>) <u>emong</u> (<u>ngimongin</u>)

donkey: ngisikirya

<u>itaikirya</u> (<u>ngitaikirya</u>)	<u>asikirya nataok</u> (<u>ngasikirya nataok</u>)	<u>asikirya naapolon</u> (<u>ngasikirya naapolok</u>)
	<u>esikirya langitou</u> (<u>ngisikirya luangitou</u>)	<u>esikirya loketepan</u> (<u>ngisikirya luketepak</u>) <u>esikirya lodongong</u> (<u>ngisikirya ludongong</u>)

camel: ngikkaala

<u>itaikaali</u> (<u>ngitankaala</u>)	<u>akaali nataok</u> (<u>ngakaala nataok</u>)	<u>akaali naapolon</u> (<u>ngakaala naapolok</u>)
	<u>ekaali langitou</u> (<u>ngikaala luangitou</u>)	<u>ekaali loketepan</u> (<u>ngikaala luketepak</u>) <u>ekaali lodongong</u> (<u>ngikaala ludongong</u>)

goat: nganginei or nganginei namee or ngamee

<u>ikale</u> (<u>ngikale</u>)	<u>akale</u> or <u>angine nakale</u> (<u>ngakale</u>)	<u>angine</u> or <u>angine naapolon</u> (<u>nganginei</u>)
	<u>ekoroi langitou</u> (<u>ngikora luangitou</u>)	<u>ekoroi loketepan</u> (<u>ngikora luketepak</u>) <u>ekoroi lodongong</u> (<u>ngikora ludongong</u>)

sheep: ngamezekin

<u>imezek</u> (<u>ngimezekin</u>)	<u>amezek nakale</u> (<u>namezekin nakale</u>)	<u>amezek naapolon</u> (<u>ngamezekin naapolok</u>)
	<u>emezek langitou</u> (<u>ngimezekin luangitou</u>)	<u>emezek loketepan</u> (<u>ngimezekin luketepak</u>) <u>emezek lodongong</u> (<u>ngimezekin ludongong</u>)

Fig. 1. Age-sex classification of livestock (terms in parentheses are plural forms).

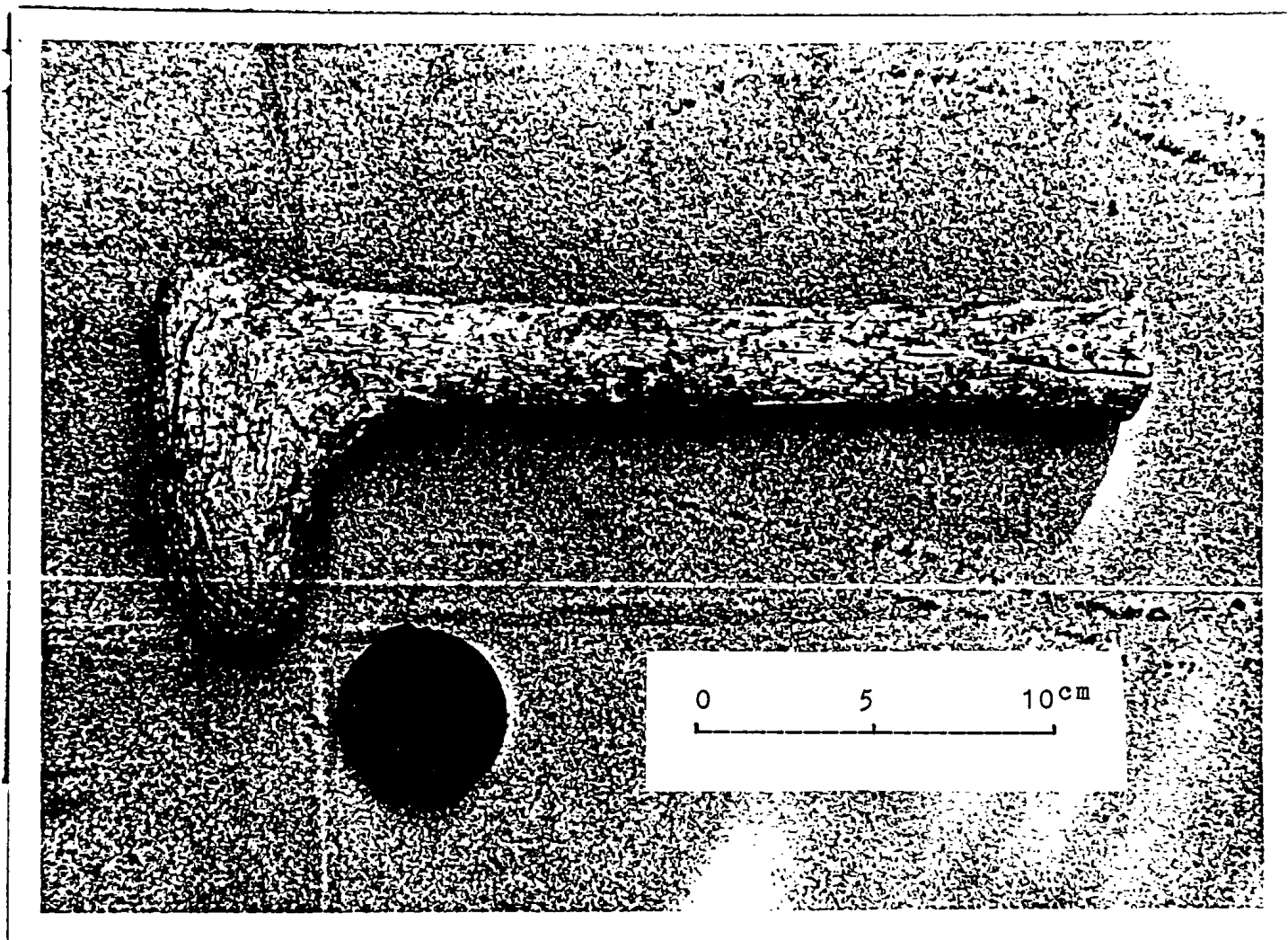
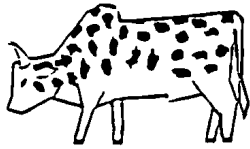
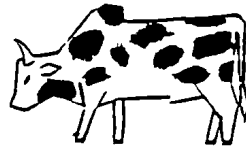


Fig. 2. wooden hammer for castration

A1. -meri
-kori



A2. -ngorok
-komoli



B1. -bubuo



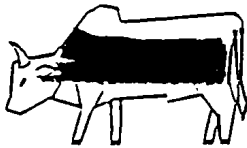
B2. -kapeli



B3. -kedikedi



B4. -koli



B5. -linga



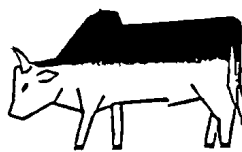
B6. -lukwa



B7. -ngole



B8. -ngora



B9. -aze



B10. -thili



B11. -tulya



B12. -wazi



Fig. 3. Coat color classification

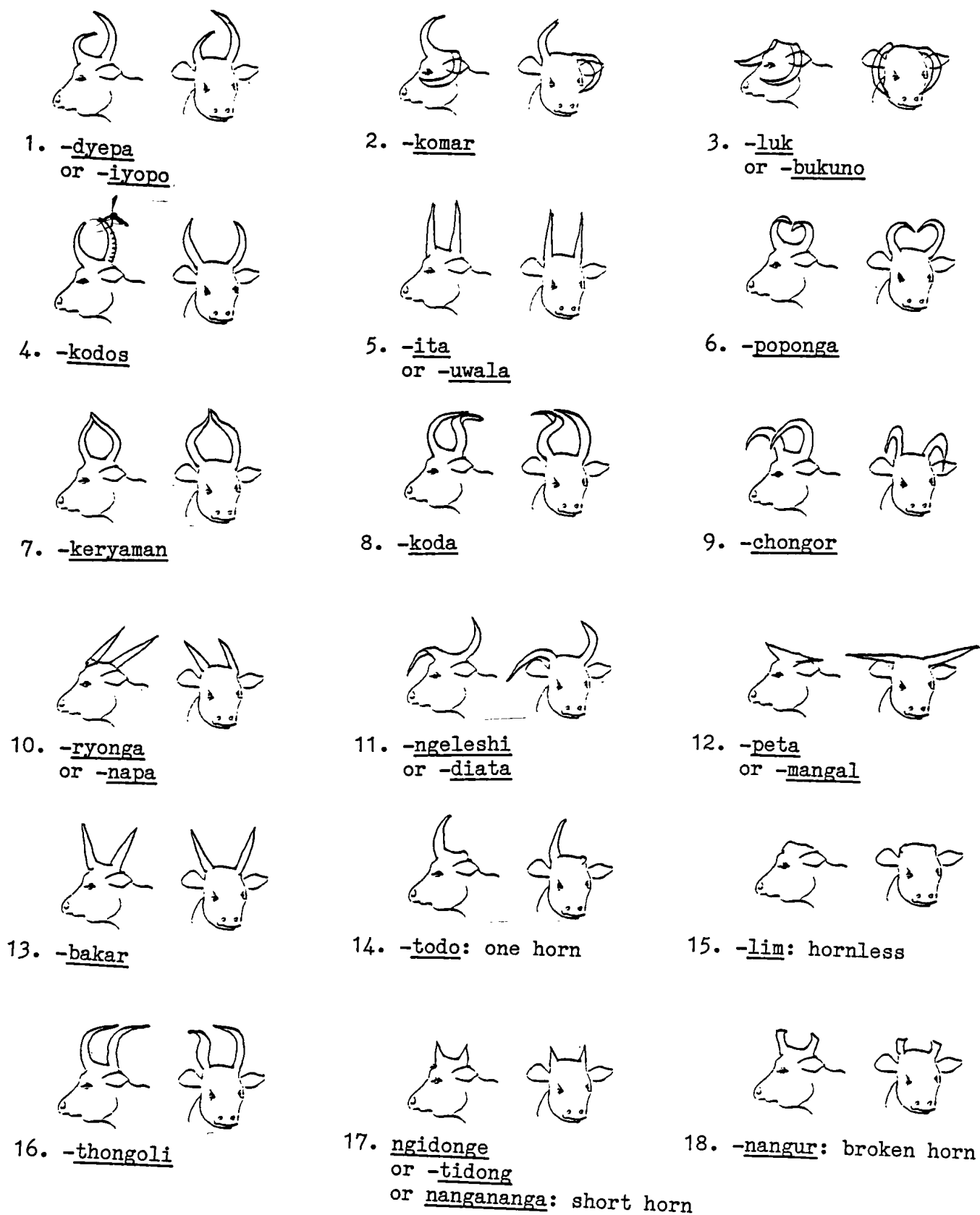


Fig. 4. Horn shape classification

way of training		type of training	type of horn-shape (Fig. 4)
beating	one horn	to tie horn and horn -----	I ----- 1
		to tie horn and skin -----	II ----- 2
	two horns	without tying -----	III ----- 3
		horn and horn -----	IV - 4,5,6,7,8
		tying horn and skin	V ----- 9
			forehead --- back ----- VI ----- 10
whittling	one horn -----	VII -----	11
	two horns	deep -----	VIII ----- 12
		shallow -----	IX ----- 13
burning	one horn -----	X -----	14
	two horns -----	XI -----	15

Fig. 5. Ways of horn training

1. itebitai



2. emunitoi



3. edoritai



4. ekochilitai



5. eirieritai



6. ewodoritai



7. engurubitoi



Fig. 6. Ear marking classification

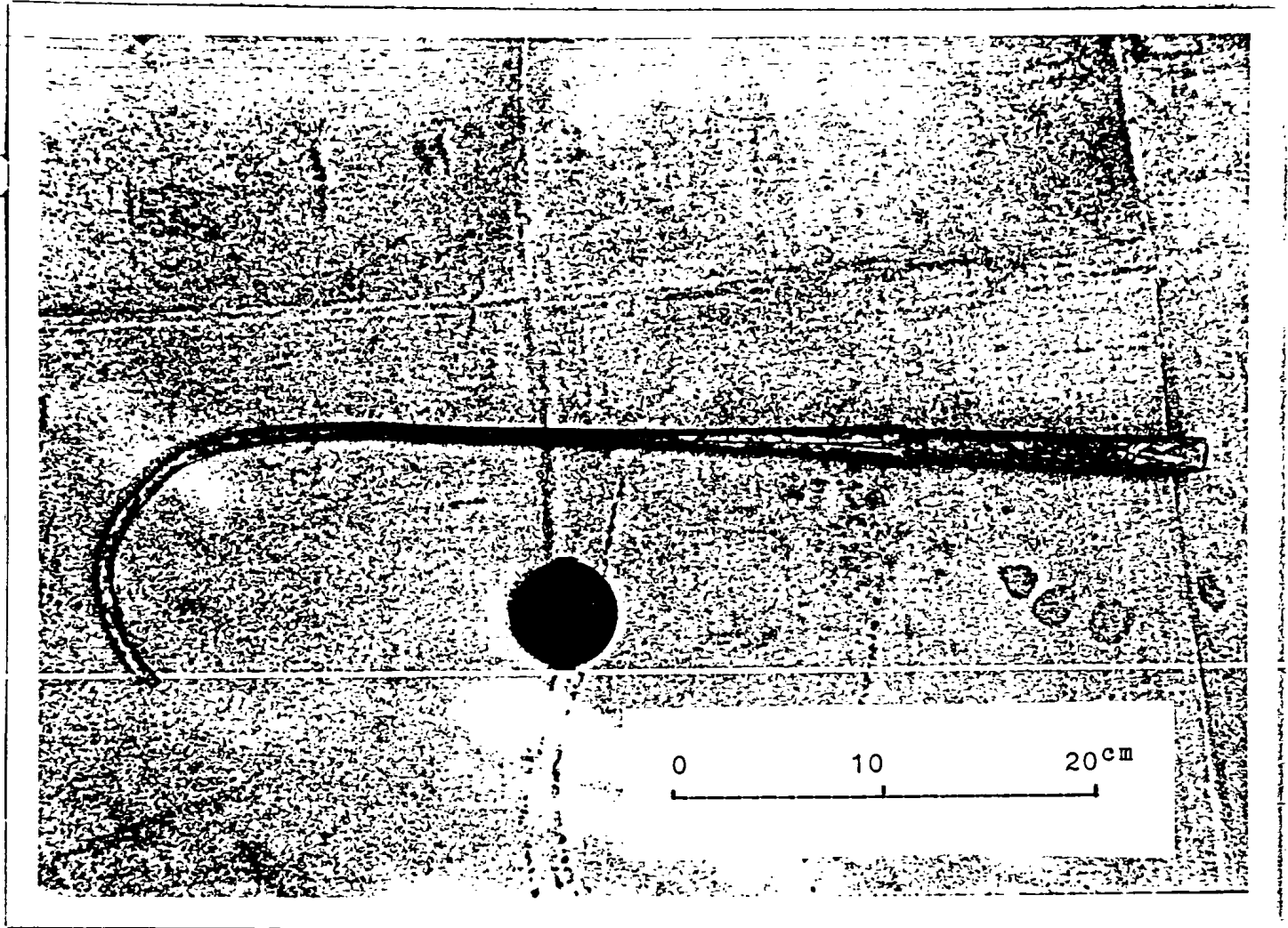


Fig. 7. branding iron

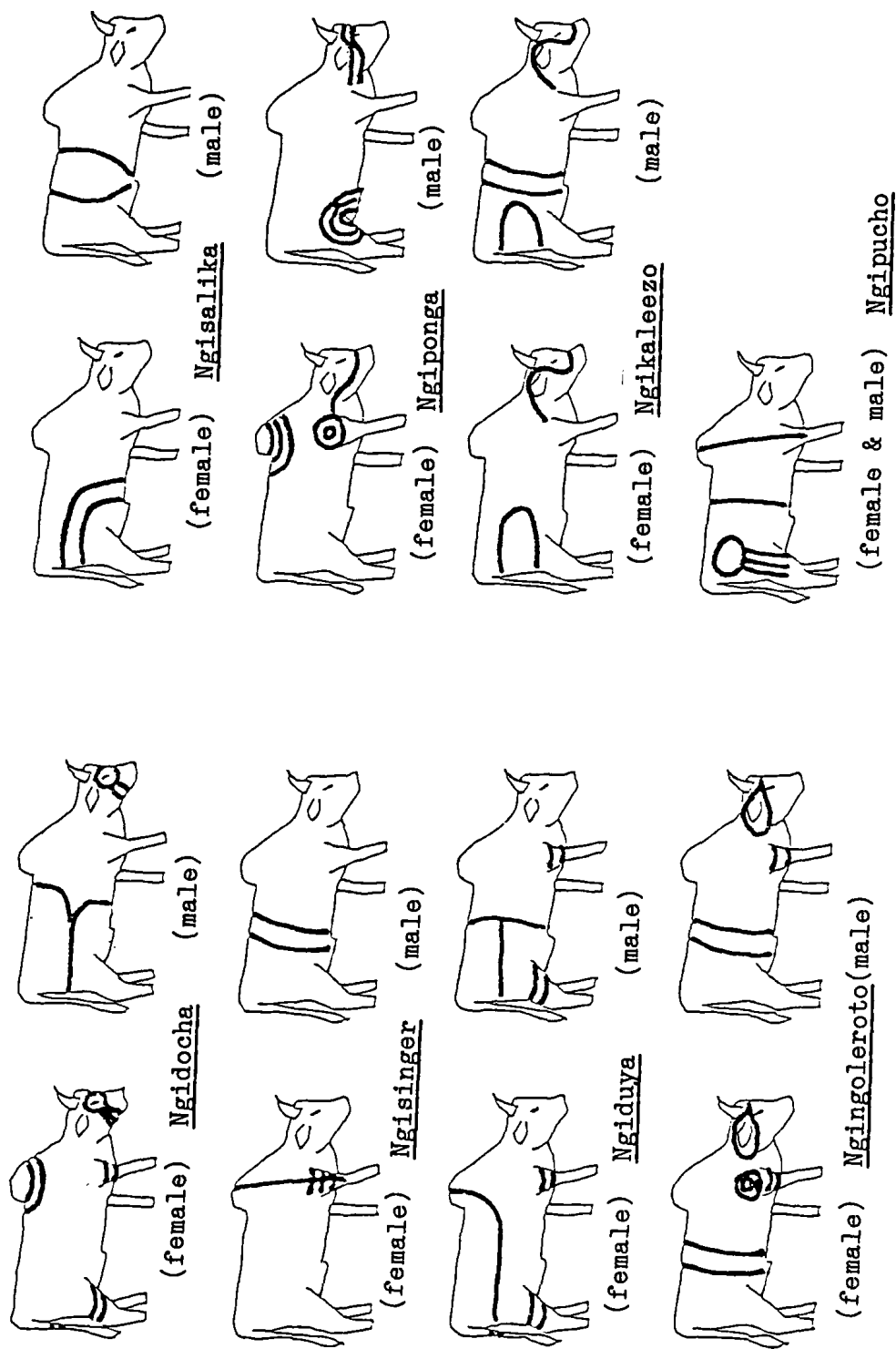


Fig. 8. Examples of livestock branding

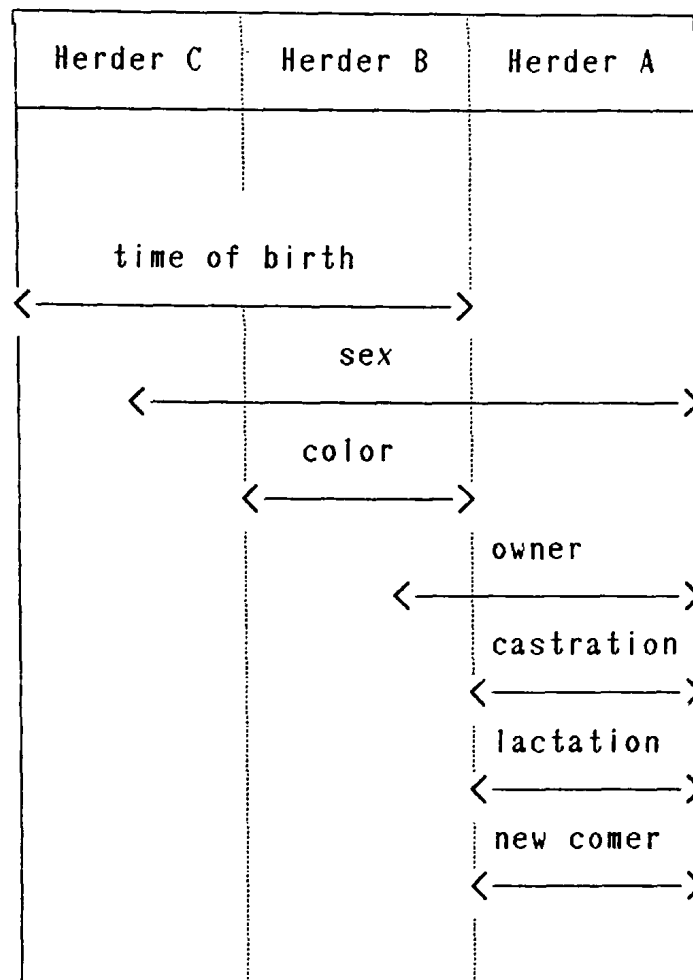


Fig. 9. Distinctive features for checking unit formation

Appendix 1. Composition of livestock names which refer to appearance of the animal by the terms including or exceptionally non-CP terms

composition	number of animal				total
	goat	cattle	camel	donkey	
names referring to other animals					
1. CP term + term of animal	2	1	-	-	3
2. term of animal only	26	7	4	1	38
3. other term + term of animal	1*	-	1*	1	3
total	29	8	5	2	44
names referring to plant					
1. term of plant only	-	2	-	-	2
names referring to horn shape					
1. CP term + term of horn-shape	3	3	-	-	6
2. term of horn-shape only	3	1	-	-	4
total	6	4	-	-	10
names referring to ear-cut					
1. CP term + term of ear-cut	2	-	-	-	2
2. term of ear-cut only	3	-	-	2	5
3. other terms	-	-	3	1	4
total	5	-	3	3	11

for CP and non-CP terms, see text.

*:resemblance in shape.

Appendix 2. Livestock names referring to animal appearance, including body terms

names and referred object (vernacular)	number of livestock				
	goat	cattle	camel	donkey	total
(i) names of CP term + body term					
(20 individuals with names referring to the color)					
[body terms employed in names are as follows]					
1. head (<u>akou</u>)	2	3	-	-	5
2. mouth (<u>akituk</u>)	2	-	-	-	2
3. belly (<u>akooki</u>)	1	1	-	-	2
4. cheek (<u>amategen</u>)	1	-	-	-	1
5. spleen (<u>etid</u> : side of belly)	1	-	-	-	1
6. ear (<u>akit</u>)	1	-	-	-	1
7. a part of neck (<u>etole</u>)	1	-	-	-	1
8. a part of neck (<u>arari</u>)	1	-	-	-	1
9. stomach (<u>aboi</u> : belly)	1	-	-	-	1
10. side of belly (<u>apoli</u>)	1	-	-	-	1
11. buttock (<u>ewosin</u>)	1	-	-	-	1
12. back (<u>akau</u>)	-	1	-	-	1
13. breast (<u>aaket</u>)	-	1	-	-	1
14. hump (<u>aruk</u>)	-	1	-	-	1
(ii) names of body term only					
a. referring to the shape (2 individuals)					
1. <u>namoiyo</u> (toes: [literally nails]: <u>ngimoiyo</u>)	1	-	-	-	1
2. <u>apenek</u> (beard: <u>epenek</u>)	1	-	-	-	1
b. referring to the color (1 individual)					
1. <u>ngakolikolya</u> (side of breast: <u>akolikoli</u>)	-	1	-	-	1
(iii) names of body term + other term					
(11 individuals with names referring to the shape)					
1. <u>aitaruk</u> (pointed hump: <u>-ita</u> + <u>aruk</u>)	-	-	2	-	2
2. <u>nakokolees</u> (ostrich-like head: <u>akou</u> + <u>ekalees</u>)	-	-	1	-	1
3. <u>aperokit</u> (lying ears: <u>akiper</u> + <u>ngaki</u>)	-	-	1	-	1
4. <u>aawoiakwas</u> (long forelegs: <u>-woi</u> + <u>ngakwas</u>)	-	-	1	-	1
5. <u>aitakituk</u> (pointed mouth: <u>-ita</u> + <u>akituk</u>)	-	-	1	-	1
6. <u>ariwotorob</u> (bent breast: <u>ariwo</u> + <u>atorob</u>)	-	-	1	-	1
7. <u>naitaki</u> (pointed ears: <u>-ita</u> + <u>ngaki</u>)	-	-	-	1	1
8. <u>akudokosim</u> (bent tail: <u>akudokin</u> + <u>ekosim</u>)	-	-	-	1	1
9. <u>ichekemuroi</u> (hairy hindlegs: <u>-chekes</u> + <u>ngamuroi</u>)	1	-	-	-	1
10. <u>akoumong</u> (ox-like head: <u>akou</u> + <u>emong</u>)	1	-	-	-	1

* For CP term and body term, see text.

Appendix 3. Livestock names which refer to animal appearance, excluding terms of horn-shape, ear-cut, animals, plants, and body-parts

names and referred object (vernacular)	number of livestock				
	goat	cattle	camel	donkey	total
(i) names of CP term + non-CP term [non-CP terms employed are as follows]					
a. names referring to the color (12 individuals)					
1. [a kind of color] (-giro)	2	-	2	-	4
2. [a kind of color] (-cherimo)	-	-	1	-	1
3. [a kind of color] (-ama)	1	-	-	-	1
4. a patch (adap)	1	-	-	-	1
5. beads (pl. ngakoloumwai)	1	-	-	-	1
6. tin (ekolo)	1	-	-	-	1
7. junction (akichari)	-	1	-	-	1
8. cover (akibur)	-	1	-	-	1
9. to shift (akinachar)	-	-	-	1	1
b. names referring to the color and shape (12 individuals)					
1. tall (eewoi)	-	-	6	-	6
2. dwarf (eureny)	2	1	1	-	4
3. hairy (achekes)	-	-	1	-	1
4. swollen (etebus: swollen stomach)	-	-	1	-	1
(ii) names of one non-CP term [terms employed are as follows]					
a. names referring to the color (29 individuals)					
1. [a part of meat] (akorot)	2	2	1	-	5
2. to glitter (akipiripiro)	2	1	-	-	3
3. [a milk product] (amori)	2	-	-	-	2
4. a mole (akemer)	1	-	1	-	2
5. scar (agerat)	1	1	-	-	2
6. [a kind of oil] (akurin)	1	-	-	-	1
7. shade (etolim)	1	-	-	-	1
8. [men's ornament] (ngakopoi)	1	-	-	-	1
9. curing wound (iporereto)	1	-	-	-	1
10. to dye by oil (akitwal)	1	-	-	-	1
11. [a man's name] (resemblance to his favorite ox)	1	-	-	-	1
12. girls' apron (akude)	-	1	-	-	1
13. girls' make-up (akiyer)	-	1	-	-	1
14. bullet cartridge (asepede)	-	1	-	-	1
15. [a kind of color] (ngorya)	-	1	-	-	1
16. [a kind of earring] (akulamait)	-	-	1	-	1
17. [name of a alternation set] (ngimoru) =they wear black feathers	-	-	-	1	1
18. girls' belt (aruba)	-	-	-	1	1
19. to tear off (akichil)	-	-	-	1	1
20. to roast meat again (akitumugianik)	-	-	-	1	1
b. names referring to the shape (6 individuals)					
1. dwarf (eureny)	-	-	2	-	2
2. pointed (echoperu: referring to ear shape)	-	-	1	-	1
3. round-backed (echuguru)	-	-	-	1	1
4. hunch backed (emuguri)	1	-	-	-	1
5. resemble (akisisare: it resembles to someone)	1	-	-	-	1

(continued)

(iii) names of two non-CP terms					
a. names referring to the color (1 individual)					
1. <u>apeipokot</u> (a leg ornament: <u>apei</u> + <u>apokot</u>)	1	-	-	-	1
b. names referring to the shape (3 individuals)					
1. <u>neewoiakwara</u> (long spear: <u>-woi</u> + <u>akwara</u>)	-	-	1	-	1
2. <u>morutoron</u> (gentle hill: <u>emoru</u> + <u>-toron</u>)	-	-	1	-	1
3. <u>lochekelim</u> (hairy & round-headed: <u>-chekes</u> + <u>-lim</u>)	-	-	1	-	1

For CP and non-CP terms, see text.

*Name elements untranslatable, e.g., proper nouns, special Turkana terms, etc., are described [in brackets].

Appendix 4. Livestock names referring to characteristics of the animals other than its appearance

names, their meaning, and the terms employed	category and number of livestock
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(1) names referring to birth situation: 22 individuals

- | | |
|--|--------------------------|
| A. [geographical feature] | 3 individuals (K2, D1) |
| B. [name of place] | 12 individuals (K10, D2) |
| C. other terms of place | 6 individuals (K2, D4) |
| 1. [plant name] | 1K, 1D |
| 2. <u>are</u> [village, or the place one usually lives] | D |
| 3. <u>naawi-a-Lomator</u> [homestead of + (a man's name)] | D |
| 4. <u>nanokaakaali</u> [camels' enclosure: <u>anok</u> + <u>akaali</u>] | D |
| 5. <u>elounyang</u> [yellow hide: <u>elou</u> + <u>-nyang</u>] | K |
| D. happening at the time of birth | |
| 1. <u>asuri</u> [running away from enemy's attack] | D |

(2) names referring to the transfer: 20 individuals

- | | |
|--|-----------------------------|
| A. [personal name] (of former owner): | 11 individuals (G7, K1, D3) |
| B. [name of group] (to which the former owner belongs): | 4 individuals (G2, K1, D1) |
| C. other terms referring to former owner: | 3 individuals (G1, K1, D1) |
| 1. <u>apaakang</u> [my grandfather: <u>apaa</u> + <u>kang</u>] | G |
| 2. <u>amasukini</u> [poor man: from maskini in Kiswahiri] | K |
| 3. <u>ikwangiworya</u> [<u>ikwa</u> (child of) + (an age-set name)] | D |
| D. way of transfer | 2 individuals (G1, D1) |
| 1. <u>napuroto</u> (exchanged with <u>epurot</u> [liquor]) | G |
| 2. <u>nakora</u> (exchanged with <u>ngikora</u> [he-goats]) | D |

(3) names referring to the behavior: 13 individuals

- | | |
|--|--------|
| 1. <u>aleleuwa</u> [bleat continuously] | G |
| 2. <u>abelobelo</u> [roll about] | G |
| 3. <u>anakatopolo</u> [suckle after being grown-up] | G |
| 4. <u>narukokomoli</u> [bleat + <u>-komoli</u> (CP term)] | G |
| 5. <u>nabaang</u> [foolish] | 1G, 1K |
| 6. <u>nabaangakori</u> [foolish + <u>-kori</u> (CP term)] | C |
| 7. <u>naburata</u> [bleat] | K |
| 8. <u>eloit</u> [milking device] | 2K |
| 9. <u>naunoi</u> (from <u>auno</u> [rope] to tie at the time of milking) | K |
| 10. <u>napudakuui</u> [step on branches] | K |
| 11. <u>ageringasaaaja</u> [refuse carrying baskets] | D |

G:goat, C:cattle, K:camel, D:donkey.
For CP and non-CP terms, see text.